E
51
U6X
CRLSSI

SHOUT
SHARE
IT

SMITHSONIAN INSTITUTION
BUREAU OF AMERICAN ETHNOLOGY
BULLETIN 81

EXCAVATIONS IN THE CHAMA VALLEY, NEW MEXICO

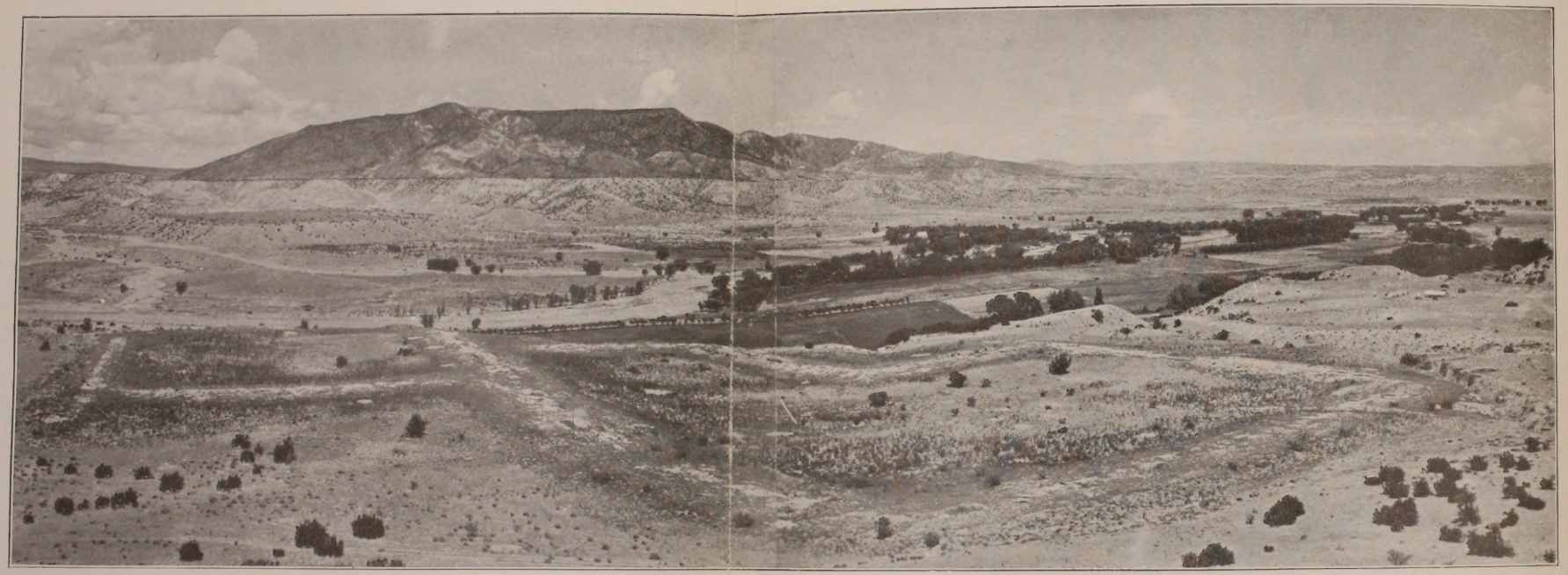
BY

J. A. JEANCON

SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

FEB 5 1924

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923



VIEW OF THE RUIN AND THE CHAMA RIVER VALLEY.

Photograph by Wesley Bradfield.

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT

75 CENTS PER COPY

PURCHASER AGREES NOT TO RESELL OR DISTRIBUTE THIS
COPY FOR PROFIT.—PUB. RES. 57, APPROVED MAY 11, 1922

LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, D. C., January 10, 1922.

SIR: I have the honor to transmit the accompanying manuscript, entitled "Excavations in the Chama Valley, New Mexico," by J. A. Jeancon, and to recommend its publication, subject to your approval, as a bulletin of this bureau.

Very respectfully,

J. WALTER FEWKES,
Chief.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

CONTENTS

	Page
Introduction	1
Description of the ruin	5
Dimensions	7
Plaza No. 1	7
Plaza No. 2	7
Rooms	8
Round room	8
Kitchen or cooking room	9
Weaving room	10
Foundations	10
Walls	11
Openings in the walls	13
Doorways	13
Floors	14
Openings in the floors	15
Fireplaces	15
Meal bins	16
Roofs	16
Kiva in plaza No. 1	16
Stone artifacts	17
Chipped implements	17
Axes	17
Mauls and hoes	18
Cutting edges	18
Pointed stones	19
Flaked and finished implements	19
Knives	19
Javelin points	19
Arrowheads	19
Spearheads	20
Spheroids	20
Polishing stones	21
Metates and manos	21
Mortars and pestles	22
Miscellaneous stone objects	23
Bone artifacts	24
Flakers	25
Scrapers for tanning hides	25
Bone breastplate	26
Bone dirks	26
Bone tubes or beads	26
Turkey calls	27
Bone flutes	27

Bone artifacts—Continued. Page
Bone awls ... 28
Bone needles and pins ... 28
Spatulas ... 29
Bone knife blades ... 29
Bone implements of uncertain use ... 29
Pipes ... 31
Pendants ... 33
Shells ... 33
Pottery ... 34
Clays and pastes ... 36
Chronology of the Po-shu pottery ... 37
Pre-Pueblo ware ... 38
Late black-and-white ware ... 38
Hard coiled ware ... 39
Duck or moccasin shape ... 39
Pinched ware ... 39
Black cooking ware ... 40
Biscuit ware ... 40
Early types ... 42
Middle types ... 42
Late types ... 44
Food bowls ... 47
Fragments of food bowls ... 49
Tubs ... 52
Large water jars ... 53
Incised ware ... 54
Red ware ... 58
Decorations ... 59
Avañu heads ... 59
Birds ... 61
Miscellaneous pottery objects ... 62
Moldies or molds ... 63
Pottery lids ... 64
Pottery gorgets ... 64
Gaming tallies ... 64
Ladles or dippers ... 64
Prayer plume bases ... 64
Biscuit ware sherds and handles ... 65
Fetishes ... 65
Koshare fetish ... 67
Firestones ... 68
Miscellaneous objects ... 68
Basketry ... 69
Pictographs ... 70
Shrines ... 70
Burials ... 73
Summary ... 75
Index ... 77

ILLUSTRATIONS

PLATES

View of the ruin and the Chama River Valley. (Frontispiece.)

1. Map of Po-shu-ouinge.
2. *A*. North side of the Chama Valley. *B*. Cross section of débris in room. *C*. Cross section showing floor levels.
3. Excavated rooms. *A*. Location 3. *B*. Location 10. *C*. Location 5.
4. *A*. Mound of the round room. *B*. Walls and double floor in round room. *C*. Cobblestone outer walls of round room. *D*. Weaving room. *E*, *F*. Kitchen.
5. *A*. Washed out wall locations. *B*, *C*. Foundation stones. *D*. Walls on top of the foundation. *E*. Cobblestone plugs. *F*. Cobblestone foundation.
6. *A*. Wall construction showing nodules. *B*. A group of nodules. *C*. Roof fragment from Spring House, Mesa Verde National Park. *D*. Plaster on the wall. *E*. Plaster partly removed, showing rectangular checking. *F*. Broken plaster.
7. *A*. Adobe brace for weak wall. *B*. Corner of a room with adobe plug on the floor. *C*. Paving, doorway and air vent. *D*. Double wall. *E*, *F*. Fireplace.
8. *A*. Doorway with remains of stick lintel. *B*. Metate sealing doorway. *C*. Oval-topped doorway. *D*, *E*. Meal bin.
9. *A*, *B*. Adobe flooring. *C*. Plaster from walls. *D*. Stick markings in adobe floor.
10. *A*. Unexcavated kiva site. *B*. Excavating the kiva. *C*. Kiva wall.
11. *A*, *B*, *C*, *F*. Mauls. *G*. Tzii-wi or war ax heads.
12. Polished ax heads.
13. *A*. Crude implements. *B*. Crude ax heads.
14. Crude flaked implements and cutting edges.
15. Fine flaked implements. *A*. Knife blades. *B*. Javelin points. *C*. Ceremonial spearhead. *D*. Leaf shaped. *E*. Spearhead or knife. *F*. Slate implement.
16. Arrow heads.
17. Stone implements. *A*, *C*. Spheroids. *B*. Floor polishers. *D*. Quartz disk. *F*. Pottery polishers.
18. *A*. Manos. *B*. Polishing stone for floors.
19. Mortars. *A*, *B*, *C*. Sandstone mortars. *D*, *E*. Lava mortars. *F*–*M*. Selenite mortars.
20. *A*. Bowl-shaped concretions. *B*. River bowlder mortar with pottery lid. *C*. Ring and ball concretions. *D*. Stone andirons.
21. Arrowshaft polishers.
22. Miscellaneous stone objects.
23. *A*. Stone pot lid. *B*. Adobe plug.
24. Bone implements. *A*, *B*. Bone flakers. *C*. Heavy bone awls.
25. Tanning tools.
26. Bone implements. *A*, *B*. Tanning tools. *C*, *D*, *E*. Use unknown.
27. *A*, *B*. Part of a headdress. *C*. Bone breastplate. *D*, *E*. Weaving implement. *F*, *G*. Dirks.

28. Bone beads.
29. *A, B.* Bone turkey calls. *C–H.* Bone flutes or pipes.
30. *A.* Bone awls, split or hollow type. *B, C, D.* Pins. *E.* Needles, solid type.
31. *A.* Spatula. *B, C.* Bone knives. *D.* Bone sliver. *E.* Spatulas.
32. Mammal and bird bones.
33. Miscellaneous bone objects.
34. *A–G.* Pipes. *H, I.* Pipes in course of manufacture.
35. Miscellaneous shells and pendants.
36. Clays and pastes.
37. Small pottery.
38. Duck or bird shaped pottery.
39. Cooking ware.
40. *A, B.* Uncovering a pot buried in the floor. *C.* Pot buried in débris. *D.* Pottery and metate in house débris.
41. Small biscuit ware bowls.
42. *A.* Incised ware. *B.* Biscuit ware. *C.* Chocolate paste ware. *D.* Red ware.
43. Ceremonial pottery.
44. *A.* Biscuit ware. *B.* Incised ware.
45. Biscuit ware.
46. *A, C–F.* Biscuit ware. *B.* Glazed decorated ware.
47. *A, B.* Water jars of biscuit ware. *C.* Red ware with glazed decoration.
48. Incised water jars, chocolate paste.
49. *A.* Gaming tallies and spindle whorls. *B.* Implements for making pottery.
50. *A.* Pot lids. *B.* Gorgets.
51. Tiponi or prayer plume bases.
52. Unusual decorations on biscuit ware sherds.
53. Biscuit ware handles.
54. Miscellaneous objects.
55. Concretion fetishes.
56. Ceremonial objects.
57. Selenite ceremonial objects.
58. Mineral objects probably used as fetishes.
59. Koshare fetishes and "firestone" kayes.
60. Wooden objects.
61. Miscellaneous objects.
62. Basket impressions in clay.
63. Pictographs.
64. Shrines.
65. Burials.

TEXT FIGURES

Page

1. Map showing location of Po-shu-ouinge with reference to Abiquiu, N. Mex. 1
2. Cross section of house débris, showing stratification 6
3. Diagram of the kiva 16
4. Flag designs 42
5. *A.* Exterior decoration on small biscuit bowl. *B.* Interior decoration on the same bowl 44
6. Interior decoration on small bowl 45
7. Mountain and cloud decorations 45
8. Turtle 48
9. Interior and exterior decoration on biscuit ware tub 49
10. Interior and exterior decoration on biscuit ware tub 49
11. Interior and exterior decoration on biscuit ware food bowls 50

Page

12. *A*. Centipede. *B*. Snakes. *C*. Fish. *D*. Dragonfly. *E*. Head of centipede. *F*. Fish. *G*. Spider woman (Navaho) 50
13. Interior decoration on biscuit ware tub 51
14. Interior and exterior decoration on biscuit ware tub 51
15. Avañu interior decoration on biscuit ware tub 52
16. Interior and exterior decoration on biscuit ware tub 52
17. Avañu decoration on biscuit ware tub 53
18. Decoration on biscuit ware sherd 53
19. Unilateral profile of cooking pots and water jars 54
20. Decoration on biscuit ware water jar 54
21. Decoration on biscuit ware water jar 55
22. Design on biscuit ware water jar 55
23. Incised designs 56
24. Incised designs 57
25. Incised designs 58
26. Incised designs 59
27. Incised mug 60
28. Red ware food bowl 60
29. Red ware food bowl 60
30. Red ware water jars 61
31. Birds, conventionalized forms 61
32. Avañu heads 62
33. Birds, life forms 63
34. Bird on a mountain 64
35. Diagram of the World Shrine 71
36. Exterior and interior decoration on bowl accompanying Burial No. 1 73
37. Exterior and interior decoration on bowl accompanying Burial No. 2 74
38. Exterior and interior decoration on bowl accompanying Burial Mo. 3 75

EXCAVATIONS IN THE CHAMA VALLEY, NEW MEXICO

By J. A. Jeancon

INTRODUCTION

In presenting this paper on the excavations carried on during the summer of 1919 in the Chama Valley it is the intention to deal with certain phases of the pre-Columbian pueblo culture of the Rio Grande and Jemez Plateau which it is believed have not been presented before in full detail. This culture has been studied to a certain extent, but there remains a vast field of virgin territory to be opened up.

On the two sides of the Chama River, from its mouth to Abiquiu, a distance of about 25 miles, there are 10 or more ruins of which practically nothing is known. From Abiquiu west the country is still a closed book, not even a scientific reconnaissance having been made in a territory covering over a hundred miles in width, and of greater length. Surveyors, ranchmen, and others who have passed through this region tell of the large numbers of ruins and minor antiquities which abound there.

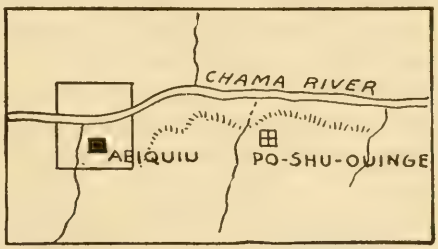


Fig. 1.—Map showing location of Po-shu-ouinge with reference to Abiquiu, New Mexico.

At a point about 22½ miles above the confluence of the Chama River and the Rio Grande, on the south side of the Chama River, is located a ruin which was formerly known as the "Turquoise village." The name, when applied to this particular ruin, was not known to any of my Tewa informants, and I learned that the correct name for it is "Po-shu-ouinge," meaning "Calabash at the end of the ridge village."[1] (Pl. 1; fig. 1.)

As a preliminary study of the farther western country this ruin was selected for excavation, with the hope that it might be a guide

[1] J. P. Harrington in his Ethnogeography of the Tewa Indians, 29th Ann. Rept. Bur. Amer. Ethn., translates it as "Squash projection height village."

to further research. New material was found, outside influence noted, and problems presented which will be dealt with in part in this paper.

The immediate vicinity of the ruin is very beautiful and the land adjacent to it and the river bed must have presented a splendid opportunity for the fields of the village. At present the whole surface of what might have been their fields is taken up by Mexican dwellings and agriculture. No evidences of former irrigating ditches or other agricultural activities are to be found, unless we except the large "mother ditch" which is still used by the Mexicans and is said to be of Indian origin.

There are two good wells at a point about 500 feet below and away from the mesa on which the ruin is located. These may have been springs which furnished the water supply for the village when it was occupied by the Indians.

We were told that there are traces of a large ditch on the mesa proper, running from a spring to the village, and bringing the water directly into the pueblo, but we were unable to find anything resembling either a ditch or a spring.

The ruin itself is located several hundred feet above the river bottoms, on a mesa which joins still higher mesas on the south. Directly across, on the north side of the river, is the mountain known to the Tewa as the "T'umayo" or "Chief Piñon Mountain." Several other names have been applied to this mountain, such as Black Mountain (English), Cerro de los Burros (Spanish), and others. It is also called "Abiquiu Mountain." This mountain must have been of particular interest to the people of Po-shu, as it, and the country immediately around it, furnished them many kinds of material for tempering their pottery, stone for making stone artifacts, crystals, quartz, and other minerals for paint and ceremonial objects.

At the northwestern foot of the T'umayo are extensive mineral and quartz beds; there may also be fossil beds, although none were found. At a short distance west of the mountain is the beginning of a vast field of copper ore of fair grade.

An abundance of piñon and small cedars covers the country in all directions. The growth is especially thick on the mesas south of the ruin. The land upon which the ruin is located has been in possession of the Cordova family since early in the eighteenth century. The exact date of the title deed is not known to the present members of the family. Señora Cordova, who is now the head of the family, told me that when as a girl she first came to the place the walls of the ruin stood a little more above the ground than at present and that occasionally, after a hard rain, a whole pot was found. Stories are told of the finding of gypsum fetishes, and I saw one,

an excellent representation of a conch shell, which is now in the possession of Mr. Cordova, one of the present generation of the family. I have also been told of the finding of silver beads, large quantities of turquoise, and some Spanish made articles. However, we found nothing made of metal of any kind, nothing indicating Spanish influence, and only two turquoise beads. If any such finds have been made I have not seen any of the articles alleged to have been found in the ruin, nor have I been able to corroborate any of the stories. The usual stories of the finding of pots of gold and silver were too absurd to receive any consideration.

While the Tewa have a name for the ruin and also for the Chama River, which they call P'op'ing (Red Water), on account of its color, there seems to be a dearth of legendary information concerning Poshu. Both San Juan and Santa Clara claim the ruin as the site of a former occupation by their ancestors, but no details could be obtained other than the above general statement.

From evidences found it would seem that the pueblo was abandoned hastily, but whether the inhabitants were driven out by sudden attack of enemies, panic, or some other cause, could not be determined from our excavations. My reason for thinking that they left hastily is this: Almost no large pieces of pottery, broken or whole, remain in the houses. Scattered over the plazas and outside of the walls are thousands of sherds of large pottery vessels. In the rooms the only whole large pieces were buried under the floors. A few large bowls, in fragments, were also found in the rooms, but fully 95 per cent of the large pieces were outside of the walls. Only one exception to this was found; this was in room 23, location 3, in the east row of plaza No. 1, and will be dealt with under the head of pottery. In contrast to this wide scattering of the large pieces, small vases, bowls, and dishes, which could have been easily transported, and many small ceremonial stone and shell objects, as well as bone artifacts of no great weight, were found in large numbers. I can see no good reason why these were left behind, unless the people departed in haste and did not have time to gather them up.

The ruin was visited in the early seventies by Dr. H. C. Yarrow and later by Mr. Adolph Bandelier. The latter did a little excavating at the site and the articles taken out are in the possession of Mr. Sam Eldot, of San Juan, New Mexico. The description of the site given by Dr. Yarrow is very short and deals mainly with the finding and uncovering of the burials. It will be given in part under that head. Bandelier's description is as follows:

> Three miles below (southeast) Abiquiu, at a place called "La Puenta" (the Bridge), on a bluff close to the river on the south bank, stands a ruin which Dr. Yarrow, of Washington, examined about 16 years ago, and of which he has given descriptions and a ground plan * * * . The height on which the ruin stands

is 48 meters (150 feet) above the river. Its gravelly slopes are very steep, so that for defense and observation the position was well chosen.

This pueblo was built of adobe, with thin plates of sandrock intercalated in some places. An average of 41 rooms measured gave 2.5 by 3.7 m. (8½ by 12 feet). The number of stories was certainly two, and in some places three. One single estufa is still visible. The long structures of the pueblo surround two good-sized courtyards or "squares," and rows of stones set on edge form appendixes to several of the mounds.

Nearly on the brink of the slope toward the river, between two mounds and forming the northeast angle of the principal square, stand the remains of a round watch-tower. It is connected with the buildings next to it by rows of stones forming little rectangles in one place, as if a few garden plots had extended between the tower and the nearest mound on that side.[2]

In a footnote on page 56 of the same report Bandelier further states: "It is also interesting to note that ruins on the Chama were also noticed in 1776 by that remarkable monk, Fray Silvestre Velez de Escalante, during his trip to the Moqui Indians by way of the San Juan country. See his *Diario* of that journey, and the *Carta al P. Morfi*, April 2, 1778 (par. 11)."

The following persons composed the personnel of the expedition: J. A. Jeancon, in charge; Don. L. Jeancon, assistant; four Santa Clara Indians, Aniceto Swaso, foreman. Through the courtesy of Dr. Edgar L. Hewett, Mr. Wesley G. Bradfield, of the School of American Research, Santa Fe, N. Mex., spent the first two weeks with us and was of invaluable assistance. Later he came out again, accompanied by Mr. Kenneth Chapman, also of the school, and spent several days with us. The expedition was in the field from June 30 to August 20, 1919. Much of the success of the expedition is due to the interest of my Indian friends who did the excavating. With the greatest care they worked in the masses of fallen walls which filled the rooms. Many hours were spent in digging with trowels, where it was impossible to dig in any other way. Often after supper, when the day's work was done, they would ask permission to go back and work an hour or two, in the cool of the evening, and many of our best finds were made at this time. Great care was exercised in taking out the objects, and they were as happy as I was when an especially good specimen was found. I heartily commend them for the good work done. My sincerest thanks are due Mr. Otto T. Mallery, of Philadelphia, for financing the expedition, and who, by his interest in the progress of the project, was a constant source of inspiration for greater endeavor. I am also indebted to Dr. J. Walter Fewkes, Chief of the Bureau of American Ethnology; Prof. W. H. Holmes, Head Curator of Anthropology, National Museum; Dr. Mitchell Carroll; Mr. Paul A. F. Walter, Secretary of the School

[2] Bandelier, Papers of the Archeological Institute of America. Final Report of Investigations among the Indians of the Southwestern United States, pt. II, pp. 56–57.

of American Research; Dr. Edgar L. Hewett, Mr. Wesley Bradfield, Mr. Kenneth Chapman, and Mr. J. P. Harrington, for kindnesses and help during the preparation and carrying out of the plans of the expedition. I also wish to express special thanks to the members of the Cordova family, Señora Gerónima M. de Cordova, Señor Celestino C. Cordova, Señor J. N. E. Quintana, and Señor Emiterio Espinosa, all of whom most graciously gave their consent to having the ruin excavated, and manifested by their assistance and many courtesies, while we were in camp, the interest they took in the work and its progress.

DESCRIPTION OF THE RUIN

The buildings composing the ruin surround two plazas or courts. Plaza No. 1 is an oblong with a rectangular indentation at the northeast corner. Plaza No. 2 is a square without indentation and much smaller. The longest row of rooms is 207.65 m. in length. The shortest row is 32.30 m. in length and is a row of rooms projecting north of the east line of plaza No. 1. In some of the locations the rows are three rooms wide and in some four. At the gateway leading out of the ruin, in the west line of plaza No. 1, are one-storied rooms, two rooms in a row. These are the only one-storied rooms found during our excavation.

At the northwest corner of plaza No. 1 is a gateway 5.48 m. wide. This is guarded by a row of rooms projecting east past the point of entrance. In the continuation of the north wall of plaza No. 2 is an opening 8.83 m. long, which may have been another gateway. The walls in this corner are so badly washed out that in many places even the foundation stones are not left, and for this reason it is very difficult to establish boundaries.

Along the inner side of the west central row of plaza No. 1 are the charred remains of what was probably a series of porches or bowers, composed of upright posts and boughs of trees. These are directly in front of the rooms, and, from the fact that the ash extends from the base of the wall outward, were probably attached to the main wall in some manner. As there are no upper walls standing at present it is impossible to definitely say how they were fastened. This type of porch or bower is still used in many of the pueblos.

The buildings originally were two and three stories high. This we ascertained in the following manner: Taking a room in the center row of rooms for an example, a trench was dug across the mound, north and south, lengthwise of the room. Enough space was cleared to enable us to cut the face of the trench perfectly perpendicular and then measurements were made. At a point 3 m. from the east wall, sloping southwest and running the entire length of the room,

was a charred line of fragments of floor material, composed of beams, twigs, and adobe, resting on 40 cm. of sand which had drifted into the room before the upper floor fell. The charred remains are all that is left of the flooring of the first floor. At a point 2.13 m. from the south wall, nearly in the center of the room, and above where the charred fragments of the first floor touched the ground, was another layer of charred remains. Covering this was a hard-packed layer of sand with large masses of slaked adobe embedded in it. This sand accumulation varied from 3 to 48 cm. in depth. Above this were the uncharred remains of the roof. (Pl. 2; fig. 2.)

The same measurements and observations were made in all parts of the ruin where we excavated. The floors and roofs had fallen

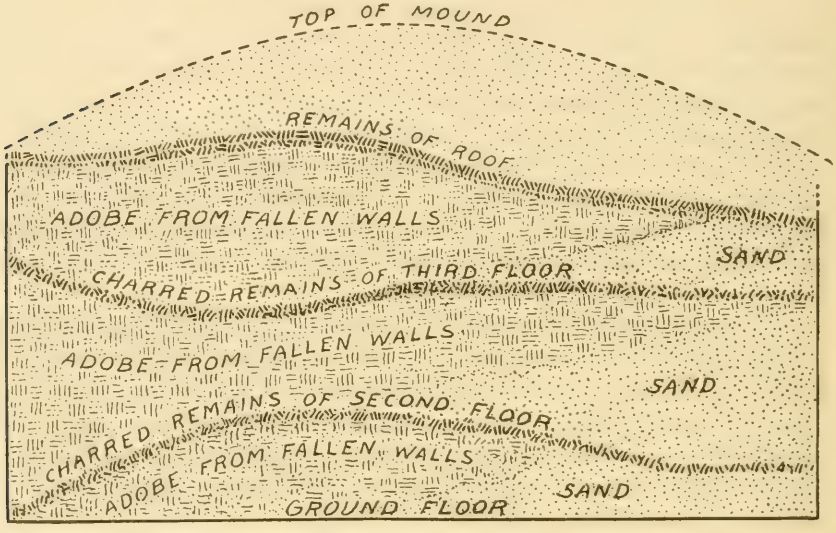


FIG. 2.—Cross section of house débris, showing stratification.

first into the rooms, sometimes en masse, sometimes only the central portions, the corners falling later, as indicated by the broken lines of charred beams and floors. Where the corners fell later they brought large masses of the side walls with them. I believe that a large percentage of the walls fell into the rooms and were afterwards washed away as the mound diminished in height. There is too much adobe in the rooms to be accounted for by only the floors and roofs. All of this accumulation has slaked down and presents a very difficult problem in excavation. The only "lazy" or soft dirt encountered was the sand and a little ash accumulation, and this was often packed very hard by the superimposed weight of the fallen masses above it.

Dimensions

The following are the dimensions of the ruin.

PLAZA NO. 1

Running north from the southeast corner to the beginning of the indentation is a row of rooms 104.77 m. in length. Projecting from this point, running north, is a row of rooms 32.30 m. in length. From the beginning of the indentation in the east line, running west to the center of the indentation, is a row of rooms 51.30 m. in length.

From the center of the indentation, running to the northeast corner of the same, is a row of rooms 60.96 m. in length. From the northeast corner of the indentation, running west to the gateway, is a row of rooms 43.33 m. in length. Here the row of rooms ends, but 30.48 m. north of this point is the beginning of another row. Beginning at this point and running west is a row 11.4 m. in length to an opening. Whether this was another gateway, or whether the rooms have all been washed out, it is impossible to tell now, as there is no trace of the foundation stones. The opening is 8.83 m. wide, then the walls begin again and continue west for 6.42 m.

From the north-central corner or west line of plaza No. 1 running south is a row of rooms 207.65 m. long.

From the southwest corner running east to the southeast corner is a row of rooms 115.44 m. long.

PLAZA NO. 2

From the northeast corner, including the round room (the round room is 5 m. inside diameter), to the northwest corner the row is all washed out; the distance is 77.74 m.

From the northwest to the southwest corner, running south, is a row 91.99 m. in length. This does not include the row projecting from the southwest corner of plaza No. 2.

From the southwest corner to the southeast corner, running east, is a row 78.94 m. in length. From the southeast corner to the northeast corner, running north, is a row 91.23 m. in length. Projecting south from the southwest corner of plaza No. 2 is a row of rooms 35.28 m. in length. The general orientation of the rooms varies from 3° to 17° from the magnetic north. The greatest variation occurs in the southwest row of plaza No. 1. At the southwest corner of this plaza the variation is only 3°. As the rooms extend north they form an arc and at a point 32.02 m. from the corner the variation is 17°. This is the greatest variation in the whole

ruin. The compass readings were made from an ordinary hand compass and are nearly enough correct to give a general idea of the orientation.

Rooms

A peculiar feature of the ruin is the size of the rooms. The largest is 5.76 by 2 m.; the smallest is 2.15 by 2 m. Most of the rooms are about 3 to 3.5 m. long and 2 to 2.5 m. wide. Large rooms such as these are unusual on the Jemez Plateau and might be taken as an indication that the ruin is of a late pre-Spanish period. (Pl. 3.)

Only one room of any depth was found. Room 5, location 10, was 2.25 m. deep, 4.84 m. long, and 1.91 m. wide. The tops of the walls showed no marks of where the joists had been set in, so that it is reasonable to suppose that originally the room was higher. This would mean a good-sized room of 1.78 m. or more in depth. The size of this room corresponds pretty well with the older rooms in the modern pueblos.

Rooms at the end of the row were usually smaller than at any other place, although in location 7 was found a very small one embodied in the main group. In some cases the uses to which the rooms were put were very clearly shown. A kitchen or cooking room—room 1, location 6—will be referred to later, as will also the weaving room—room 2, location 6. Four rooms, which I judged were ceremonial rooms from the objects found in them, were in almost the same relative location in each row—on the east, north, west, and south sides of plaza No. 1. They were not all on the same floor level. Room 10, location 12 (east side), was a ground-floor room; room 2, location 9 (north side), was a second-story room; room 14, location 8 (west side), was a second-story room; room 14, location 7 (south side), was a ground-floor room. None of these had a bench or other distinguishing feature such as occurs in a kiva or kisu, and I only judge their use from the ceremonial objects which were found in them.

Room 23, location 3, in the second story, was unquestionably a storage room of some sort, for in this room we found a vast number of broken bowls, storage jars, and other pottery, which indicated, from the manner in which the fragments lay, that they had been packed one inside of the other.

Round Room

At the northeast corner of plaza No. 2 is one of the most interesting features of the whole ruin. This is a round room built over an oblong one. (Pl. 4.) The north line of plaza No. 2 projects beyond the east line, forming a sort of guard wall for the northern entrance to plaza No. 1. At a point where the two lines meet is the round room. From evidences determined by the excavations,

we judged that for some reason the round room was built at a later period than the remaining part of the ruin. The oblong room below it is not complete; the south wall is gone and only partial traces of the west wall remain. The east wall runs out into the plaza for a distance of 1 m. and is below the wall of the round room. The walls of the oblong room are of the same type of construction as is found in all parts of the ruin. The walls of the round room are built almost entirely of bowlders from the river bottom. They were laid up in adobe mortar and plastered over with the same material. There are two well-defined floor levels, that of the oblong room being 485 mm. below the other. Both floors were made in the same way. In the east wall of the round room, where the wall was carried down to the level of the lower room, is a small doorway built level with the ground outside, similar to the openings found in the modern kiva of today. The old wall of the oblong room was torn down so that the doorway in the outer wall could be utilized. The distance between the walls is 585 mm. In the ground which was used to bring the level of the oblong room to that of the round room were found only the sherds of biscuit and incised ware. On the round room level were no sherds, but a few pieces of flaked stone, some pieces of bone, of no definite form, and a piece of deer antler. All of these articles are of the same type and character as those found elsewhere in the ruin.

As to the function of the room, no opinion has been formed, as there is not enough material to indicate its character. Whether it was a watchtower (judging from its prominent position overlooking the whole valley in all directions) or whether it was a kiva I am not prepared to say.

The walls of the round room are so far gone that it is impossible to even estimate the height of the room. It is along the north wall in which this room occurs that practically all of the rooms are washed out, and the amount of débris which formed the mound of the round room would hardly be enough to give a room over 1 m. in height. Possibly there were adobe walls placed above the stone walls to give the required height, but no trace of these remains.

KITCHEN OR COOKING ROOM

In room 1, location 6, were several interesting fireplaces. (Pl. 4.) In about the middle of the west wall was a fireplace 457 mm. long by 231 mm. wide. It was well plastered and raised 5 cm. above the floor. Alongside of this was a semicircular plastered place, 350 mm. wide and 86 mm. deep, level with the floor. In this were found the remains of a cooking pot. In the southeast corner of the same room was a large adobe plate, 475 mm. by 401 mm., set 51 mm. above the floor, with a binding wall on the north and south. This plate was covered with a thick, hard coat of floor composite and was very greasy.

Marks of fire and soot were all over it and it was suggested by the Indians that it was used to make the "tissue paper" bread, or "buwa yave." Next to the plate was a meal bin which was in very bad condition. The whole floor of the room was very greasy and it must have been used a long time for a cooking room.

WEAVING ROOM

The floor of room 2, location 6, was of unusual interest and gave us a clue to its use. There are 11 holes in a row in about the center of the room. They are not evenly spaced, as can be seen from the illustration. (Pl. 4, *D*.) At the western end of the row is a depression 127 mm. wide and 49 to 75 mm. deep. This room I believe to have been a weaving room, and the holes in the floor were for the purpose of setting up the loom. The depression at the western end of the row was for the purpose of depositing weaving tools, yarn, etc. There were no remains of upright parts of the loom in any of the holes, and the room contained nothing but the débris of the fallen walls.

Room 23, location 10, may have been a grinding room, as there were three metates in it. These were not in bins but scattered about the room. This was the largest number of metates found in any one room. There were only a few metates found in the whole ruin, although manos, or handstones, were abundant. One informant from Santa Clara, a man of 60 years or more, said that in his youth it was the custom to have rooms set aside for grinding and that the women gathered there and ground the meal, while the men sang the mealing songs. Each woman would bring her own corn and mano, and the gatherings partook somewhat of the nature of a social gathering.

FOUNDATIONS

Upon my first visit to the ruin I was surprised to see, in certain locations which will be described in this section, large numbers of bowlders set on end in rows, and with other rows running off at right angles from them. These we later found to be foundation stones, which had been exposed by the washing away of the walls above them. At all points of the excavation we found that the rows of stone constituted the foundations and they were all placed alike. (Pl. 5.)

The northern row of rooms of plaza No. 2 is entirely washed out, leaving only the foundation stones in situ, and affording an excellent example of the placing of these stones. (Pl. 5.) At a distance of 12 m. west of the base of the round tower we made an excavation 1.1 m. in depth, to determine whether there were any more floors or walls beneath the present surface, and found only the native soil. At a point 7.5 m. and at another point 14 m. northeast from this exca-

vation we dug other holes, 1 and 1.3 m., respectively, in depth, and again encountered the native soil; thus proving that there were no floors or other house remains below the present level in that place. There is no doubt that the walls and floors were completely washed out along this line, which is about 22 m. above the road at the foot of the mesa. Along the sides of the mesa, below this point, and for some distance out onto the level, are potsherds which have been washed down from above. The same washing out of walls and floors occurs in several other places in a greater or less degree.

Walls

After the cobbles were set in the sandy surface of the mesa the interstices were filled with nodules of adobe and the erection of the wall proceeded. (Pl. 6.) The following description of the erecting of a wall which I saw built by a woman at Santa Clara will give a good idea of the manner in which the walls of the ruin were constructed. Having selected and laid out the line where the wall was to be built, she mixed her clay or adobe thoroughly, then taking up as much as she could conveniently carry in her two hands, each piece about the size of a large apple (pl. 6), she laid them on the line, which in the case of the ruin would be represented by the cobblestones set on end. The nodules of clay were then patted and molded into place and she went back to her puddle for more. This process was continued until the desired height was obtained and the wall was left to dry. The next day I was surprised to find that the shrinkage in the wall from drying was not following the line and form of the nodules, but more or less forming square and oblong masses of various sizes, and showing what appeared to be fairly regular courses. I also observed the same type of shrinkage in the newly erected church at Santa Clara. The cracks caused by the shrinkage were afterwards filled with wet clay and allowed to dry before the final wash was put on.

There is no doubt that the walls of the ruin were built in the same manner as the one I have just described. We tore apart sections of walls in all of the locations and found the same type of nodule and the same kind of shrinkage into square or oblong masses. The cracks, as at Santa Clara, were filled in after the wall was dry, or at least partially dry. However, we found this difference: all of the wall surface in the cracks was smoked clear through the wall. This condition was accounted for by one of the laborers who was born at Hano on the Walpi (Hopi) Mesa. He said that often when the Hopi build a wall and want it to dry quickly they build a fire along the base of it and dry it in that way. The chinking showed no marks of fire on the inside, thus demonstrating that it was placed in position later. Although no foreign matter, such as sticks, charcoal, or ash, were used for

temper, the walls being composed solely of clay or adobe, they are exceedingly durable and hard, especially after they are plastered. A small amount of sand enters naturally into the composition of the clay in this section of the country.

The vast amount of labor involved in the building of a pueblo such as this can easily be imagined. The workmanship is far superior to that of any found in modern pueblos.

After the laying and the drying of the wall was completed a coat of wash was put on. The largest number of coats of wash found on a wall at this ruin was 23. This was in a single room in the main row of the west wall of plaza No. 1. The smallest number of coats, which seemed to be a pretty good average all over the ruin, was 17. In some cases the wash had a heavy base of gypsum and must have presented a handsome appearance. (Pl. 6.)

In three different places—two in the west row of plaza No. 1 and one in the south row of the same plaza—were small sections of painted plaster in combinations of red and black, red and yellow, and red, yellow, and black. Whether these were ceremonial paintings or only bands of color running around the rooms we were unable to determine, as the plastering fell from the walls as the rooms were excavated, and only small bits were recovered. These were carefully preserved and are now in the collection.

That the walls were originally in good plumb is still evident. Some of them are now badly bulged out, but I think this is due to the masses which fell into the rooms and disturbed the original line. One case (pl. 7), the dividing line between rooms 23 and 24, location 3, is of extreme interest. Mr. Bradfield, who was in the field with me, contends that the upper-story wall slid from its base and now rests on the ground floor. The Indians, however, contend that the original wall of the lower story for some reason could not support the upper one, and when the upper one was put on the lower part started to buckle, and to prevent it from completely collapsing a socket or brace of adobe was placed against the base of the lower wall to retain it and give the proper support. Only one other case of this kind was found. This occurred between rooms 5 and 6, location 12. Here the supporting wall was marked even more plainly and the evidence was more conclusive, the general appearance being that of a double wall. The retaining wall, full thickness, began at the south end of the rooms and extended toward the north, and at about three-fourths of the length of the room diminished in thickness until it finally disappeared, entirely blending with the original wall.

The use of the supporting wall of adobe is well known to the Indians of to-day, and I know of at least two cases of this kind in Santa Clara, as well as cases in the Mexican villages. In only one

place did we find a real double wall. This was in the north wall of room 13, location 6. (Pl. 7.)

Both sides of the inside wall were smoked and had been plastered. The inside of the outer wall was also smoked. A part of a charred cedar beam was found at the foot of the inside wall (northwest corner) and might possibly indicate that the beams being too short for the outside wall, another wall was built closer in. This is the explanation given by the Indians. They cited cases of a similar nature as having occurred at Santa Clara. Hundreds of measurements of the walls made in all the different locations showed that there is no great variation in the thickness of them. Not a single case was found where the walls were thicker than 35 cm. and an average of 30 cm. will hold good in all of the rooms we excavated.

OPENINGS IN THE WALLS

With the exception of small round openings varying from 16 to 26 cm. in diameter, we found no openings of any kind leading out into the plaza in the lower stories.

The round openings in the walls occurred in the interior walls as well as the exterior ones and were probably vents or air holes. These were often filled with plugs, one of which is seen in Plate 7, resting on the floor below the hole from which it was taken. There are two of these plugs in the collection. They are made of adobe, and after being inserted into the hole in the wall they were plastered around, and in some cases completely over, with the same material, thus filling the entire opening. In one case we found a plug made of a mixture of wood ash and adobe and plastered with the same kind of a mixture. These were the only cases of mixtures encountered, excepting the floors.

There does not seem to have been any set rule as to the number of vents that should be in a room, and as far as we could ascertain no attempts were made to obtain regular drafts or cross currents of air. Usually the vents occurred near the doorways or close to the corners of the rooms.

At first we thought that the unstopped vents might have been used for cupboards or repositories of small articles, but not a thing was found in any of them. Niches or storage places in the walls, such as are found in other ruins, did not occur at this one. In room 5, location 2, were two vents plugged with large river bowlders. (Pl. 5.)

DOORWAYS

Doorways occurred in the inner walls leading from room to room, but not in the outer walls. It must be remembered that only the lower walls are now standing and that the upper stories probably had doorways leading out onto the terraces that were formed by the

lower rooms. Between rooms 8 and 11, location 8, was a typical doorway, 36 cm. in height by 34 cm. in width, and having a round top. (Pl. 8.) Jambs, top and bottom, were nicely plastered, as was usually the case in most places. A few doorways were found with the stone sill in situ.

The doorway between rooms 23 and 24, location 3, had a wooden lintel; originally there must have been a row of rods set across the top so as to form this lintel, with adobe nodules placed above it to carry up the wall. (Pl. 8.) Only one of the rods was in situ and it was so badly rotted that no estimate of the diameter could be made, nor were there any indications as to the number of rods used, as the wall on the north side had fallen away so that only a shell remained without any stick markings. This was the only case of a wooden lintel that we found.

Between rooms 27 and 28, location 3, was a typical oblong square doorway. (Pl. 7.) This is the type that was most frequently met with. Between rooms 7 and 8, location 3, was one of the oval-top type. The stone slab used to cover the opening stood at the base of the wall alongside of it.

We found no traces of casing or recessed jambs such as are found at Mesa Verde and other ruins, where stone slabs had been used for doors. I think the slab was rested on the slightly projecting sill and leaned against the wall at the top of the opening. Nothing suggesting wooden slab doors or hangings of hide, cotton, or other fabrics over the openings was found.

Not a single case occurred where the jambs, lintels, and sill were all made of stone, as sometimes occurs on the Jemez Plateau.

In the middle of the south wall of room 20, location 10, was a sealed doorway. A metate had been set up in the opening and mud plastered all around it. (Pl. 8.) In many cases we found doorways sealed with chunks of adobe much larger than the nodules in the walls.

Floors

The floors were composed of a mixture of ash, grease, very fine charcoal, water, and adobe. This mixture was applied in a semiliquid condition, which, when partially dry, was beaten down so as to form a solid mass, which is easily distinguishable from anything else. After the composite was properly laid down it was polished with a flat stone, many of which we found. There is no doubt that additional washes of this mixture were put on as the necessity arose, as we found floors with different colored layers showing, in the cross section, where the floor had lost its polish and other coats of wash had been applied. An average thickness of the black polished floor surface in the rooms excavated is 6 mm. The thickest floor surface encountered was 22 mm. and showed many coats of wash. (Pl. 9.)

In only one place did we find any attempt at paving with stone slabs. This was in room 8, location 3. About one-fourth of the floor was covered with large slabs of stone. (Pl. 7.) In a very few places single large plates of stone were found set in the floor. The purpose of these is not known to me. They bore no marks of fire and upon removing them we found no cavities under them.

OPENINGS IN THE FLOORS

There was a great variety in the openings in the floors. In many cases these were small pits with nicely plastered walls, which varied greatly in diameter, depth, and form. In some cases the mouth or opening was larger than the body of the pit; in others, just the reverse. The usual bottle-shaped pits occurred in great numbers and seem to have taken the place of the wall niche, which was entirely missing.

There is no definite place for any of the pits, as they sometimes occur at a distance from the walls, sometimes in corners, sometimes beside the fireplaces; in fact, any place that seemed to please the fancy of the maker. In depth they varied from 152 mm. to 45 cm. The openings, even in the smaller ones, were always large enough to admit the hand freely. Nothing was found in any of them.

FIREPLACES

Fireplaces occurred in many of the rooms and varied from a simple group of bowlders to well-plastered and well-arranged fireplaces that would do credit to a more modern pueblo. A good fireplace is shown in Plate 7. The sides were built of stones set on end and plastered. The room wall formed the back of the fireplace and was also plastered and smoked up.

Another fireplace consisted only of a flat stone placed at the base of a wall, which still shows a heavy coat of soot and smoke stain. This is in an inside room, No. 8, location 3, and had another story above it.

Fireplaces occurred oftener against the middle of the wall in a room than any other place, although a few were found in corners. In some cases where the middle of the wall was used for the back of a fireplace we found another fireplace in the débris of the room above, in a similar position. There were no evidences of chimneys, and as the fireplaces were not confined to the exterior rooms, but often occurred in the interior rooms, even when the buildings were two and three stories high, the question of how they disposed of the smoke is an interesting one, and so far I have not been able to answer it.

Meal Bins

Meal bins in the floors were oblong or square, and always well plastered. A typical one was found in room 6, location 6. The dimensions are 43 cm. in length, 28 cm. in width, and 165 mm. in depth. The corners are all well rounded. No remains of meal were found in any of the bins. The usual location of the meal bins in this ruin was in or near a corner. (Pl. 8.)

Roofs

Both the roofs and floors presented no very different features from those found in most pre-Spanish ruins in the Southwest. In well-defined strata we found the remains of floor and roof material, but in such bad condition that we could not even bring a small section of it away. However, by careful work enough was uncovered to show the manner of construction, which is as follows: First, beams were placed in position on the top of the adobe wall; covering these laterally were rods, and again in an opposite direction were heavy masses of twigs and brush; in a few cases there were layers of cedar bast. Finally, over all a heavy covering of adobe was placed directly on the twigs or bast.

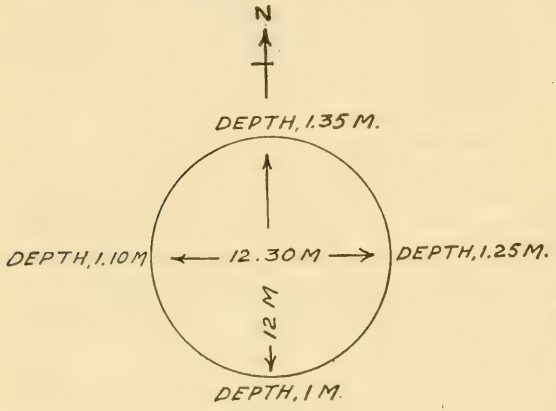


Fig. 3.—Diagram of the kiva.

A photograph of a section of flooring from Spring House, Mesa Verde, in southwestern Colorado, is used as an illustration of the manner in which floors and roofs were generally built in the pre-Spanish ruins of the Southwest. This illustration is used because the floors and roofs at Po-shu were constructed in the same manner and no good photograph could be obtained there. (Pl. 6.)

Kiva in Plaza No. 1

Upon my first visit to the ruin I was struck by the fact that only one kiva was to be seen. I supposed that others would appear as the excavation proceeded, but was disappointed. We found a number of rooms that were undoubtedly ceremonial in character, but there was only one round kiva.

We attempted to excavate the kiva, but after two days spent in the most strenuous efforts we abandoned it. In two days we were

only able to dig a trench about a meter in width and 40 cm. in depth around the inside of the walls. At that rate it would have taken us almost two weeks to completely uncover the whole building, and it was abandoned for some other time. (Pl. 10.)

The building was unusually large, as will be seen from the diagram in Figure 3. The same types of walls and pottery were found as in all other locations of the ruin. There are evidences that the original building was raised several feet above the ground, thus making it only semisubterranean. On the east side, in the interior, were the charred remains of two posts which assisted in holding up the roof. As the wooden portions of the building had all been destroyed by fire there was no way of telling how the roof beams were arranged. A curious thing in connection with the plaster on the walls was that it was white, not colored, as we found the plaster in so many places; the floor was also covered with a wash of white. There were seven coats of plaster on the walls.

STONE ARTIFACTS

While the stone artifacts of the collection do not present any strikingly new features, there are many of them that are of great interest. Especially interesting are the partly formed pieces which occur in large numbers.

A curious thing in connection with the finding of the stone artifacts is that in direct conjunction with the crudest types were found some of the finest specimens that could be desired. It does not necessarily follow that the same person made both types, but it is logical to suppose that excellent workers of stone dwelt in the village, and while some of the finer pieces may have been acquired by barter, undoubtedly some of the cruder ones were made by experienced workmen. Possibly it was the intention to finish some of the roughly chipped pieces, but for reasons unknown to us this was not done. It is also possible that some of the roughly made pieces were never intended to be finished, and as they answered the purpose for which they were intended they were left as they are now. There are specimens in the collection representing almost every stage of the work, from the beginning to the end of the process.

Chipped Implements

AXES

Axes range from the crudest forms and workmanship to beautifully made and polished specimens. The technique is interesting, in that it shows many varieties of chipping.

With the exception of the crudely chipped two-headed ax, it is my belief that all of the axes were for domestic purposes. The sharp

edge of a newly chipped ax would answer very well for the purpose of felling trees and trimming the ends afterwards. The two-headed ax (pl. 11, *G*) is typical of the Jemez Plateau and is called by the Tewa a "tzii-wi" (two flake or two point). It was supposed to have been used only in war. The hematite two-headed ax is very unusual and somewhat resembles the eastern "banner stone," excepting that it has no hole drilled in it for fitting the shaft through. Hematite is seldom used in the Jemez Plateau; quartz and agates are more often used for making the war ax.

The polished ax heads must have consumed a large amount of labor in the making of them. The materials from which they are made are extremely hard and difficult to work. Some of these have two grooves for fastening the haft and others have only one. (Pl. 12.)

MAULS AND HOES

The four maul heads are interesting from the diversity of material used. Two (pl. 11, *A*, *A*) are of a very hard granitoid, with forms resembling those of the mound bowlders. One (pl. 11, *B*) is made of lava and the other (pl. 11, *C*) is a small river bowlder.

There are several specimens that may well have been used for hoes or grubbing tools. (Pl. 13.) As there are no marks of rubbing of the handles on the sides of these, it may be possible that they were bound onto the handle at the notches, and if this was really the case they could easily have been used as hoes or grubbing tools. The specimens marked Plate 13, *B*, resemble picks and would be very effective for breaking up the ground. The material for all the artifacts in this section was found in the surrounding country, river beds, and hills.

CUTTING EDGES

The cruder types of cutting edges in the collection are of such a character that it is very important to study them. Many of them at first present the appearance of simply being rejects. However, upon closer examination most of them show, in a greater or less degree, signs of having been used. As a finished flaked knife must have involved a large amount of labor in the making, it is reasonable to suppose that where a large flake was found or purposely broken off which had a good, sharp cutting edge it was used without any more preparation. It would be interesting to know just how much exact knowledge of the cleavage of the various materials the prehistoric people had.

While it may be supposed that many of the crude flakes have been used, yet some of them show no marks of use, and therefore it is problematic as to whether they were actually made use of or only retained as rejects or additional raw material.

The serrated edge of one type of flake (pl. 14, *A*) has sometimes caused it to be called a "firestone," and the manner in which it was used is the same as striking flint and steel to produce a spark. There is, of course, a possibility that such was its use, but after a careful examination and finding the shape adapted to the hand, it seems safe to suggest that some of them were used as saws. This type of cutting edge would be good for cutting bone, wood, and other materials of a similar nature.

The larger leaf-shaped cutting edge could have had a twofold purpose, namely, that of cutting with the keen edge and scraping by holding the flake sidewise. (Pl. 14, *B*.)

Round-bladed examples occur (pl. 14, *C*) and present no suggestion as to their specific use.

The amount of work spent on the specimen Plate 14, *E*, shows plainly that it was not a reject but was used. Its specific use is conjectural, but it adapts itself very well to the scraping off of bits of flesh and hair from a fresh hide.

Both of the specimens shown in Plate 14, *A*, *F*, could be readily fitted with handles and thus form crude but effective knives.

POINTED STONES

A number of pointed stones were found. (Pl. 14, *D*.) All of them are too small to be used as "coup-points" such as are mentioned by Warren K. Moorehead and Henry F. Osborn, but, fitted with handles, would prove very good weapons in hand-to-hand fighting.

Flaked and Finished Stone Implements

KNIVES

The flaked stone knives (pl. 15, *A*) show plainly their character and purpose, and although no blades with handles were found in this ruin, yet it is safe to assume that at one time they had handles. The forms of these vary from typical blades to some that are more or less eccentric.

JAVELIN POINTS

The name "javelin points" has been given to the type shown in Plate 15, *B*, as they are too small for a full-sized spearhead and too large for an arrowhead. They range from 63 to 89 mm. in length.

ARROWHEADS

These present no new features. There is a great variety of form, ranging from ordinary notched to triangular, leaf-shaped, and serrated edged heads. (Pl. 16.) The materials used in making them were obsidian, quartz, and agate.

SPEARHEADS

Only two examples of the large spearhead were found. It seems probable that their use was purely ceremonial. Plate 15, *C*, shows an unusually well made and handsome specimen. When this was found all of the Indians gathered around and examined it very carefully with exclamations of pleasure, and with a sort of reverence. Upon being questioned as to its special value, aside from its beauty, Aniceto Swaso, the oldest man in the party, put it inside of his shirt against his naked left breast, pressed and patted it, and repeated this performance on both his cheeks and forehead. Finally he held the point about an inch from his mouth and inhaled deeply several times. At last he said that the so-called "spearhead" was ceremonial and would bring the owner strength and courage in the chase and in battle. This same information was given the author by several other Tewa who came to his workshop during the winter to see the things taken out of the ruin. The manner of wearing the spearhead was to bind it to the naked left breast over the heart—which Swaso located at the nipple of the left breast. Whether there were fetishes or other things to be worn with it could not be learned. It is 113 mm. long and 40 mm. at the widest point. The material is a sort of hornblende.

The same information concerning this type of spearhead and the manner of wearing it on the body was given the author by Mr. J. P. Harrington in connection with some of the Indians of California.

The leaf-shaped blade (pl. 15, *D*) is very unusual for the Southwest. Its specific use is not known. It is 106 mm. in length and 45 mm. in greatest width. The material is a pink and white agate.

Another uncommon form is what might have been a spearhead or a knife blade. (Pl. 15, *E*.) A great amount of labor was expended in the cross chipping of this piece. It is 112 mm. in length and 48 mm. at the widest point.

The specimen, Plate 15, *F*, may have been a skinning tool of some kind and is made of slate.

SPHEROIDS

The finding of spheroids in the ruins of the Jemez Plateau is not unusual, as quantities of them occur everywhere in the region. There is a great diversity in form and size, some of them being well rounded and others very irregular. Those found at Po-shu are broken and pecked on the periphery and more or less flattened at one or both poles. (Pl. 17, *A*, *C*.) Among the other uses to which the Hopi still put this type is the roughing, by pecking, of the surfaces of the metate or lower grinding stone.

Mr. Neil M. Judd reports the finding of a large number of these in an excavation carried on by him at Paragonah, Utah.[3]

Stones similar to these are described by Stewart Culin in a report on American Indian games under the head of "Ball games." This report ascribes a number of different uses to the spheroids.[4]

A few specimens of spheroids somewhat larger than the ones used in the kicking and shinny games have nothing to indicate their uses. They have all been nicely smoothed all over the surface.

Dr. J. Walter Fewkes, speaking of those found by him in Arizona, says: "There are many spheroid stones, resembling those still sometimes used in Tusayan on important occasions as badges of authority. These stones were tied in a buckskin bag which was attached to a stick and used as a war club."[5]

Some of these spheroids have a shallow depression worn in the flattened pole. (Pl. 17, *A*.) The disk-shaped stone, Plate 17, *B*, is unusual in that it is beautifully polished at the flattened pole and broken on the periphery. Its use is not known. There is a possibility that it may have been used in some ceremony. On pages 730–731 of the report last quoted Dr. Fewkes says: "There are found disk-shaped stones pecked on the periphery as if used in the grinding of pigment or in bruising seeds, and spheroidal stones with the facet worn at one pole as if used for the same or a similar purpose."

POLISHING STONES

The ruin yielded a good collection of what is ordinarily called the pottery polishing stone. The manner in which these stones are used is as follows: When the pot has assumed the desired form it is set aside for the clay to dry. When this is accomplished a wash of yellow ocher is applied in the case of the red ware and no wash in the case of the black ware. After the wash is dry such parts as are desired to present a polished appearance are rubbed and polished with the polishing stone. Many of the women in the villages have polishing stones that have been handed down for generations. (Pl. 17, *F*.)

There are many different sized polishing stones, some of which are known to have been used for specific purposes. (Pl. 17, *B*.) It is no uncommon sight, in some of the modern villages, to see a woman using the larger polishing stones to polish her dirt floor.

METATES AND MANOS

The metates found at Po-shu present no unusual features. The only remarkable thing is that there were so few of them. In the total number of 127 rooms uncovered we found only five metates.

[3] Archæological investigations at Paragonah, Utah. Smithsonian Pub. No. 2536, p. 17, footnote.

[4] American Indian Games. Twenty-fourth Ann. Rept. Bur. Amer. Ethn., Washington, 1907.

[5] Archæological Expedition to Arizona in 1895. Seventeenth Ann. Rept. Bur. Amer. Ethn., p. 625, Washington, 1898.

While many examples of manos or upper hand-stones were found, showing a great variety of form and size, there is nothing unusual in any of them, and for that reason they do not need description. There were a few that are smaller than the regulation mano, but they do not present any other feature of interest. (Pl. 18, *A*.)

MORTARS AND PESTLES

During the excavation some excellent specimens of large, rough mortars were found. Accompanying each mortar was always a large spheroid. These were so large and unhandy to grasp that it was remarkable that they were used as pestles or grinders in the mortars, yet there is no evidence that they were used for any other purpose.

There are a number of pestles of different shapes and sizes in the collection. These were not always found in conjunction with mortars, but their general form and pecked ends indicate their use.

A variety of forms were shown in the large mortars. Some were very shallow, others huge deep bowls. One form with raised walls on three sides suggested the deep oblong metates found in Mexico. Some of these may have been used for grinding seeds and roots, others for grinding dried meat or pounding fresh meat to make it tender.

The mortars of malpais, tufa, and basalt are rather crude in form. In only one specimen was there any attempt to fashion the outside. Possibly the mortars in this group were used for pigments and herbs. (Pl. 19, *D*, *E*.)

The small sandstone mortars show that more work was expended on them, and with only one exception they are all somewhat shaped on the outside. The soft sandstone lends itself easily to shaping, and that may be the reason why they are more finished. Some of these show striations made by the tool used in excavating the bowl. (Pl. 19, *A*, *B*, *C*.)

The bowl-shaped concretions are most interesting in that they were found in the houses and in some cases show some wear. The larger ones appear to be volcanic bubbles which were broken off. The Indians finding them would naturally think of them as some sort of supernatural cup or bowl and take them to their homes. When first found by us in the ruin some of them had what appeared to be traces of meal in them, and this led to the suggestion that they were used as receptacles for sacred meal or pollen. To what use the smaller ones were put can not be determined unless we find the present-day Pueblos using them. (Pl. 20, *A*.)

One curious mortar is made of a small river bowlder with a shallow bowl pecked into it. It is 78 mm. long, 63 mm. wide at the widest part, and ranging from 138 mm. to 38 mm. in height. The oval bowl is 34 mm. in length and 38 mm. in width. The deepest part

of the bowl is 131 mm. in depth. Accompanying it was a pottery lid which is 63 mm. in diameter on the bottom, which is flat. The top is slightly convex. The interior of the mortar shows very little use, but the top, where the lid rested on it, shows much wear. What the purpose of this mortar was it is impossible to say. (Pl. 20, *B*.)

On account of their beauty and number, the calcite mortars form one of the most striking and interesting portions of the whole collection. From time to time, in other excavations, mortars of different kinds of stone and shapes have been found, but it remained for Po-shu to yield the largest and most beautiful group of calcite mortars. Ranging from fragmentary parts in the course of construction to the finely finished pieces, they enable us to study the whole process of manufacture. The material itself is unique. The fact that the rhomboidal calcite crystals are only one degree softer than steel presented a problem in manufacture, to the man of the stone age, that was rather serious. In some cases the crystals were preserved intact on the top of the mortar, in other cases they were broken off and the surface ground down to a smoothness that was very pleasing and must have involved a large amount of labor. Most of the mortars are of a beautiful satiny white color and where the crystals have been left intact the rhomboidal form is very apparent. Plate 19, *G*, is tinted with a ferruginous stain and at first appears to be made of rose quartz. This specimen is by far the handsomest in the collection. A white quartz pestle was found in the top of this mortar. The beautiful rose-tinted crystals were left intact on the top and only partly ground off from the sides. Inside the bowl can be plainly seen the rhomboidal forms of the crystals. Its greatest diameter is 228 mm. and it is 114 mm. at the highest part. The greatest depth of the bowl is 89 mm. The bottom has been smoothed off flat.

Plate 19, *J*, contains some mineral as well as calcite, possibly zinc, and is extremely heavy. The rhomboidal crystal is missing and the material does not appear so hard as the other mortars.

Plate 19, *F*, appears at first to be of a different material from the others, but responds to the sulphuric acid test the same as they do, although it is somewhat harder.

Many of the mortars have incisions representing the four cardinal points, which may be taken as an indication that they were used ceremonially.

Miscellaneous Stone Objects

The type of artifact known as arrow shaft straighteners is too well known to necessitate any lengthy description. (Pl. 21.) Those found at Po-shu present a great variety in materials used in making them. Sandstone predominates and there are some made of a very hard stone. Some of the pieces have only one groove, some many.

The finding of potsherds which have one or more grooves cut in them is not usual in this section of the country. (Pl. 21.) The sandy content of the paste used in making pottery presents a fine surface for rubbing down a small bone tool to a fine point.

Pieces of slate were sometimes rubbed against other harder stones and the dust used as a black pigment. There are several pieces of slate that were used for that purpose in the collection. It is the belief of the author that the black paint derived from this source was not used for other than ceremonial purposes. (Pl. 22.)

A number of round, flat covers made of stone were found in situ over the mouth of the storage jars under the floors and thus their use is indicated. There were many of them in the ruin. (Pl. 23, *A*.)

All through the ruin were found conical stones varying greatly in size and height. They were invariably found in fireplaces, and so the author has called them firedogs or andirons. Usually they were in groups of three, and in one case, room 8, location 3, the remains of a black cooking pot were still sitting on the top of the three. They are all badly burned and in a very friable condition. The largest one taken out is 292 mm. in height and 140 mm. in diameter at the bottom. Practically all of them were made of sandstone. (Pl. 20, *D*.)

The black polished surface of the baking stones found in the ruin plainly indicates their character. They were used for making the "tissue paper" bread which is still used in some of the pueblos.

In room 8, location 3, were found a lot of flat stones used for paving the floor. (Pl. 8.) The use of stone as a pavement in the rooms was unique and very seldom occurs on the Jemez Plateau.

Many odd-shaped stones showing a few marks of use were found and one of the most unique is the stone ball and ring (pl. 20, *C*) which was found in room 1, location 5. The stone ring, which is a natural formation, is 63 mm. at the largest outside diameter, with a hole having oblique sides. This hole is 32 mm. at the largest diameter. All of the surfaces of the ring show some rubbing. Deposited in the hole was a hematite ball, perfectly round and polished. (Pl. 20, *C*.)

The large slab of stone found on the floor in room 7, location 3, was used as a door to close the doorway between rooms 7 and 8. It was found at the base of the wall beside the doorway. It measures 305 mm. across the base, 203 mm. across the top, 465 mm. in length, and is of an average thickness of 30 mm. One side of it shows plainly the pecking done to dress it to the desired thickness. The top corners are rounded to fit the doorway without really entering it.

BONE ARTIFACTS

The ruin of Po-shu yielded an unusually large number of bone artifacts. The variety of form and excellent workmanship show a vast and varied use of bone as a material for making certain types of arti-

facts. Large quantities of unworked bone were found in the rooms, and the manner in which they were left seemed to indicate that they were, in part at least, being saved for future use. Turkeys, wild ducks, herons, and other fowls and birds furnished the material for the finer and smaller tools, while deer, elk, bear, coyote, beaver, and other large animals yielded bones for implements of greater strength.

In room 23, location 10, were found four large scrapers, several bone awls, some buckhorn, and a few unworked bones. This was the largest yield of bone artifacts from any one room.

Flakers

These tools were used to make arrowheads and small flaked articles. The author has made many arrowheads with bones shaped as these are. The one marked *A*, Plate 24, is held in the left hand with the flake against the bone; the smaller piece (Pl. 24, *B*) is held in the right hand and pressure is brought to bear against the flake along the line of cleavage. This causes a chip to break off from the main flake. By practice, almost any kind of a flake or one of any size desired can be flaked off. Often in finishing the work the finer chipping is done by laying the unfinished artifact on a piece of buckskin which rests in some hard material, and the chipping is done by pressure applied from above.

The longer of the two specimens marked *A*, Plate 24, is 28 cm. long, slightly distorted and curved, with an average width of 12 mm., narrowing slightly at the ends, which are rubbed to blunt points. The other one, marked *A*, is 27 cm. long and not so badly distorted; it is of an average width of 12 mm., with one end rubbed to a round point, rather blunt; the other end is rubbed to a slightly broad and fine point.

The smaller pieces are from 69 to 98 mm. in length and vary as much in diameter as in length. All of these artifacts are made of buckhorn.

Scrapers for Tanning Hides

There are three well-defined types of tanning scrapers in the collection. The first type is represented by *A*, *B*, *C*, Plate 25. They are the bones of some large animal with concave surfaces running lengthwise on one side. Starting with *A* and finishing with *C*, the group shows the manner of manufacturing a tool of this type. Those lettered *D* on the same plate belong to the second type and are of a sort of draw-shave form. They are made from the pelvic bones of some large animal. Usually the socket of the joint is a little to one side of the center of the posterior surface. The anterior always contains the curved, rubbed blade.

At one point, in the course of tanning, the wet hide is hung over the top of a post and the hair and small particles of flesh are scraped off with both of these types. The curved part of the blade varies in size and perhaps more than one scraper was used; the difference in the curve making it possible to get a better scraping surface.

The third type is that of the chisel form (pl. 26, *A*), a large bone sharpened at one end and having the joint cut off. This kind of a scraper or tanning tool is used to-day by many of the Indians to soften a hide when the tanning process is nearing the end. The form is not an unusual one.

Bone Breastplate

The finding of the remains of what was unquestionably a bone breastplate is of great interest, as it assists in establishing the fact that this form of ornament or protector is of an early date and not as recent as some would have us believe. The one found at Po-shu was composed of five or more pieces of rib bones with holes drilled a short distance from each end. The ribs are all graduated as to length, the longest being 165 mm. long and the shortest 133 mm. long. Whether the five pieces recovered constituted the entire breastplate or whether there were more pieces we are not able to say. Careful search failed to reward us with any more pieces. They are all well polished and the ends slightly rounded. A small tip of buffalo horn accompanied the breastplate, but this crumbled before it could be taken out They were found in room 4, location 6. (Pl. 27, *C*.)

Bone Dirks

The length and general character of Plate 27, *F, G*, would indicate that they were bone dirks or daggers. The long, slender form of these, when in good condition, would provide a weapon that would be very effective at close quarters. *F* is 222 mm. in length and was originally longer, as the point is broken off. *G* is 228 mm. in length and also has a broken point.

Bone Tubes or Beads

Tubular bone beads present a large variety of form and size; in length they vary from 10 mm. to 176 mm. and in diameter from 3 mm. to 23 mm. (Pl. 28.) All are nicely polished and show wear. Plate 28, *A*, *B*, *C*, are interesting in that they were found together in room 10, location 7, and appear to give various steps in the preparation and manufacture of the bead. *D*, on the same plate, has a hole bored through the sides in opposite direction to the hole running through the bone. This was found in room 23, location 3.

There is a possibility that some of the longer tubes were not intended for beads, but might be unfinished turkey calls or flutes. Again

it is possible that the larger ones were intended for the making of a breastplate such as is worn by some of the northern tribes. How far back the tubular bone breastplate extends the author does not know, but the finding, in this ruin, of one made of rib bones suggests that they might have also used the tubes in a like manner.

Turkey Calls

These bones were used to call the wild turkeys. (Pl. 29, *A*, *B*.) By covering the hole in the side a different pitch can be obtained. The manner in which they were used is as follows: The opening at the top of the bone is placed tightly against the lower lip, a little below the opening of the mouth; then drawing the upper lip down with a slight puckering of the whole mouth, and sucking in with a short, chirping breath, the tone produced will resemble that of a mother turkey calling its young. By careful practice in covering and uncovering, more or less, the hole in the side, and a slight difference in the forming of the lips, it is an easy matter to imitate all of the calls of the wild turkey. These turkey calls are still in use in some of the pueblos and are especially used by the older men, who imitate the different calls in a remarkable manner. The one marked *B*, Plate 29, is only partly made.

Bone Flutes

Po-shu yielded a most interesting collection of bone flutes. What scale the flute would produce the author does not know. Many attempts have been made to have some one produce all of the tones, but so far they have not been successful. One of the Indian laborers managed to produce a few tones, but not enough to give any idea of the scale of the instrument. His manner of playing a cornstalk flute, which I heard and saw him use, was to place the flute perpendicularly pressed to the lips and blow across the opening in the top of the stalk, fingering the holes without any attempt at a definite melody. He attempted to play one of the bone flutes in a similar manner and only succeeded in getting a few disconnected intervals. It does not seem likely that there ever was a plug or stopper in the interior of the flutes found, such as occurs in the modern tin fife. In some of the modern Indian flutes a stopper is used on the outside, but even this is missing on the bone flutes, and the use of the outside plug or stopper was probably learned from the white man. No melodies could be produced on the bone flutes, as no scientific principle was used in their construction. Doubtless the Indian who made them simply desired to produce tones that would be pleasing to him.

The following are the dimensions of the flute shown in Plate 29: *C*, leg bone of a large bird, possibly a heron, 18 mm. long. It must

have been longer originally, as one end is broken off. It has three holes together and one higher up. The first hole is 50 mm. from the bottom of the bone, the second 25 mm. from the first, and the third is 35 mm. above the second. From the third hole to the top is a distance of 63 mm. *D* has three holes set closely together. The fourth hole is 50 mm. above the third. Total length, 155 mm.; diameter, 80 mm. *E* has four holes almost equidistant. Total length, 158 mm.; average diameter, 128 mm. *F* is somewhat similar to *D*. Total length, 145 mm.; average diameter, 10 mm. *G* has five equidistant holes. Total length, 137 mm.; average diameter, 9 mm. *H* has three equidistant holes at one end and a single hole almost at the other end. Total length, 170 mm.; average diameter, 12 mm.

Bone Awls

The bone awl referred to here is the short, stubby one. All of these are made of heavy bones, one joint being left intact to aid in grasping the awl. There is no question that this type was used for the purpose of sewing heavy materials, such as hides, moccasins, etc. The thick, stocky form of this type of awl would support the strong pressure necessary to penetrate heavy materials, and at the same time would have bulk enough to permit of a firm grasp. They vary in length from 50 to 101 mm. (Pl. 24, *C*.)

Bone Needles and Pins

The split-bone type of needle was for lighter sewing. (Pl. 30, *A*.) They have not the strength requisite to resist heavy pressure and were used on lighter materials, such as skins, and possibly cotton cloth, although no cotton fabrics were found in this ruin. They vary in length from 74 to 145 mm. in length.

Not all of the solid-bone type can be called needles. There is every reason to suppose that some of them were used as pins.

In some of the Hopi villages where the primitive manta or homespun dress is still worn, one sees, occasionally, the manta held together with long pins such as are in the collection. These are shown on Plate 30. *B* measures 219 mm. in length. *C* measures 177 mm. in length. *D* measures 167 mm. in length. They are all of a slim and graceful form with long slender points. The shorter ones may have filled the twofold purpose of pins as well as needles. *E* on the same plate is unusual on account of the groove cut around it near the blunt end. It is possible that a thread of yucca or cotton was tied in this groove, thus taking the place of the eye in the modern needle. The balance, marked *F*, present a variety of form and size, but nothing unusual in their general appearance.

Spatulas

This type of artifact has given rise to a good deal of speculation as to its actual use. Resembling as it does certain tools of the modern sculptor, it has been suggested that it was used in the molding of pottery. Unless the ancient potters used a radically different method of making their pots from that of the Pueblos of to-day, this theory would not hold good. The author has seen many pieces of pottery in the course of construction and completion, and has never seen a tool of the character of a spatula used in any part of the process. It is very true that the sharp end of the spatula could have been used for making the incisions on the incised ware, but it is not reasonable to suppose that they would go to the trouble of making as fine and elaborate a tool as a spatula and only use one end of it. (Pl. 31.)

It has also been suggested that they were used in the process of weaving in a similar manner to that of the "comb" used by the Navajo weavers.

It has also been suggested that the broad end of the spatula was used to scatter sacred meal or pollen in some of the ceremonies.

If we had any definite knowledge of the use to which this type of artifact was put it would be easy to account for the diversity in form and size of spatulas found. Plate 31, *A*, has a hole bored in the side of the broad end of it. The group shown in Plate 31 vary in length from 183 to 88 mm. The broad ends vary from 27 to 15 mm. in width. Some of them have very sharp points and others have the points broken off. The polished surfaces show considerable wear.

Bone Knife Blades

Owing to the fact that Plate 31, *B*, *C*, are strongly suggestive of knife blades, they have been tentatively called by that name. As in the case of the spatulas, their use is difficult to imagine. The cutting edge is not sharp enough to be of any practical value, and even if affixed to a wooden handle, such as is sometimes fastened to a stone blade, the brittle quality of the bone would preclude any great amount of service.

Bone Implements of Uncertain Use

The large shoulder blade (pl. 26, *B*) is probably that of an elk or large deer. The use to which it was put is problematic. There are two purposes to which it is admirably suited, the one as a spade for digging, the other as a flesher. By laying the green hide on the ground and using the shoulder blade as a chisel for scraping off the remaining shreds of flesh it would be very effective. It is 288 mm. in length and 191 mm. in width at the widest part of the blade.

The entire piece shows marks of polish and wear. The cup-shaped articular surface of the joint is intact.

Remains of the antlers of deer, and possibly elk, were found in fair quantities. In most cases the specimens were in such crumbly condition that it was impossible to get them out entire. All fragments were gathered up and saved, although they were not numbered. Three pieces (pl. 26, *C*, *D*, *E*) were found, consisting each of about 8 to 10 cm. of the antler where it sets into the socket in the skull. The opposite end of the articular surface is cut across in a convex form and may have been used in a similar manner to that of a pestle.

In room 14, location 3, were the remains of what was probably a deer-horn dance headdress. Part of the prongs (pl. 27, *A*) and a fragment of tortoise carapace (pl. 27, *B*) pierced with a row of holes for attaching feathers to it were found. When uncovered their position indicated that it was a headdress such as is still worn among the Rio Grande people in the Buffalo dance. The larger prong, although broken in two, has been mended and is now complete. It is 20 mm. in length and has a hole at the large end for attaching it to the rest of the headdress.

The worked leg bones of birds and small mammals, and others of a like shape, are of very curious character and give no index as to their use. Some of them have the appearance of having been made into a sort of miniature drawshave, although what they could have been used on it is impossible to say. Those marked *A*, Plate 32, are mammal bones; the others illustrated in the same plate are bird bones. Some of these show a great deal of polishing and scraping and others do not. In room 20, location 3, a large number of these bones, in an unworked condition, were found accompanying a large number of smaller bones of a different type. The whole lot were in the remains of a biscuit-ware bowl. There were no skulls of birds or small animals with the bones. There is a possibility that some of the bones were attached by thongs to a stick and used as a rattle, as is still the custom among some of the northern peoples.

The knuckle bones illustrated in Plate 33, *A*, have been tentatively classed as necklace pendants, as in other localities in the Jemez Plateau similar ones have been found pierced for stringing.

Bones with incisions (pl. 33, *B*, *B*) are interesting in that they show the preparation for splitting. A sharp cutting edge of stone, such as has been described, would, with a little patience, cut through a bone such as these and give two good pieces for making awls and needles. Unlike similar bones in course of preparation which were found in other localities, these are only incised on one side and not on both. Plate 27, *D*, *E*, were found lying together in room 5, location 8. It was suggested by the Indians that these two bones were used in the

making of woven belts. One man, who is a belt weaver, said that he used similar pieces, but his were made of wood instead of bone. According to his explanation *D* was used for the purpose of pressing the weft into place and *E* to separate the strands of the warp. Both of these bones show wear, although the scratches on *E* run lengthwise with the bone instead of around it as one would naturally expect to find if it really was used for weaving as has been suggested. *D* has no well-defined scratches on it but is nicely polished. *E* is 148 mm. in length and *D* is 209 mm. in length. Plate 31, *D*, is an oblong piece of bone measuring 19 mm. in length at one end and 13 mm. at the other end, and is 91 mm. at the longest part. It may have been used in the course of weaving belts, either to separate the warp or to press down the weft.

PIPES

The use of tobacco, sometimes pure, sometimes mixed with herbs, pine needles, kinnikinnick, and other things, seems to have been universal in North America. The region of the Jemez Plateau is no exception and has given us many specimens of the pipes used in ancient times. Those of Po-shu are more or less typical of this region as well as of the Rio Grande country, and only one new form was found, namely, that of a fragment of a right-angle pipe which does not seem to belong to either group. (Pl. 34, *A*.) This specimen was found at a depth of about 1 m. below the surface of the mound, and there is no reason to suppose that it is anything but pre-Columbian, as the material of which it is made is the typical paste used in making the biscuit ware. It is difficult to determine the whole form of the pipe, as only a fragment was recovered. Whether the mouthpiece was of reed or of clay can not be determined as it now stands. The bowl shows marks of having been smoked and the whole thing is suggestive of a pipe form which developed among the Pueblos at a comparatively modern period, and which was made for purely commercial purposes.

With reference to the modernness of this form of pipe, I quote Dr. Fewkes: "The form of pipe used in most ceremonials to-day has a bowl with its axis at right angles to the stem, but so far as I have studied ancient Pueblo pipes this form appears to be a modern innovation."[6]

Dr. Earl Morris reports the finding of a true elbow pipe three-eighths of a mile south of the Aztec ruin; also elbow pipes from Pueblo Bonito and two other sites, one 15 miles, the other 35 miles west of Aztec, and affirms that they were known and used over a considerable portion of the San Juan drainage in black-on-white time.[7]

[6] Fewkes, J. Walter, Expedition to Arizona in 1895. 17th Ann. Rept. Bur. Am. Ethn., p. 734.
[7] Morris, The Aztec ruin. Anthr. Papers, Am. Mus. Nat. Hist., vol. xxvi, pt. 1, p. 26.

The right-angle pipe found at Po-shu is not a real elbow pipe but may have been related to that form.

The large pipe (pl. 34, *C*) is a cloud blower or ceremonial pipe. It is made of clay, or rather a very sandy paste, with considerable mica in it, and then burned. There is no evidence that it ever had a reed mouthpiece, such as is found in the California pipes, or a bone mouthpiece such as was found by Dr. Hough in the Rio Puerco region in Arizona in 1901.

A similar pipe is described by Dr. Fewkes in an account of "one of the most archaic portions of the ceremonies about the altar of the Antelope priesthood, at the time of the snake-dance at Walpi. . . . The *wu-kó-tco-ño* is a huge, stemless pipe, which has a large opening in the blunt end and a smaller one in the pointed. It is 5 inches long, 1 inch in diameter at the large aperture, and its greatest circumference is 7½ inches."[8]

One other pipe presents an unusual feature for this region. The fragment (pl. 34, *B*) shows a variation of mouthpiece which is seldom found in the Jemez Plateau or Rio Grande. It has two lateral wings sloping to the mouth end. These at present are somewhat rubbed down, but must originally have been quite a bit wider than they are now. The material is the same paste as the biscuit-ware pottery with a red wash applied after the pipe was sun dried and before it was burned in the kiln.

In hunting for pipes with lateral wings such as this one has I have only found one other specimen mentioned. Again quoting Dr. Fewkes from the report previously mentioned with reference to a pipe found at Sikyatki, he says, "One of these is very smooth, almost glazed and enlarged into two lateral wings near the mouth end."[8a] The one found at Po-shu is not glazed, but was polished with a polishing stone and suggested a glaze.

The tubular pipes show an interesting variety of form and material. Plate 34, *D*, appeared at first to be made of catlinite, or, as it is better known, Minnesota pipestone, but upon more careful examination it was found to be made of a very fine, close-grained clay. This is a particularly well made and handsome specimen.

The one marked *E* on the same plate is of fine sandstone, showing the striations produced by the stone drill in cutting out the inside of the pipe. Another pipe of clay (pl. 34, *F*) has a collar with lines running around the large end and incised lines from the collar to the mouth end. A poorly baked specimen in the shorter cloud-blower (pl. 34, *G*) is decorated with four lines of dot impressions running from the large end to the small. The other pipes do not present any unusual features.

Two specimens in the course of construction are shown in Plate 34.

---

[8] Fewkes, op. cit.

[8a] Op. cit., p. 735.

PENDANTS

Pendants were and are one of the favorite forms of personal ornaments of the American Indian. The natural expression of some form of artifact as an adornment of the person took many forms, and the pendant worn at the neck or from the ears was one of the most prominent of these expressions. The pendants of Po-shu are varied and in some cases are very handsome.

The two pieces lettered *A*, Plate 35, are unpierced pendants, the material used being selenite, which adapted itself very well to carving and shaping. The three pieces marked *B*, same plate, are also unpierced pendants and are made of sandstone.

That pendants of stone were sometimes painted after having been shaped and pierced is shown in the one marked *C*, Plate 35. This one was painted red on the front, the back being left the natural color of the sandstone of which it is made. It is pierced with three holes and is 24 mm. wide by 41 mm. long.

A rather rough pendant is the one marked *D*, Plate 35. This is nothing more or less than a potsherd rubbed into the present shape and perforated with one hole. Pottery was often used for making pendants and many made of this material have been found. It is, however, remarkable that almost invariably the pendant is made of a sherd instead of being planned and made of the clay before it was baked. The excellent results obtained from the use of selenite or gypsum in the making of pendants is shown in Plate 35, *E*, *F*, *G*. *E* is broken at the top but still shows three perforations.

Our modern arts and crafts workmen could well afford to be proud of a product of their craft if they could turn out two as beautiful and exquisite pieces as those marked *F* and *G*, Plate 35. Originally they must have been slightly translucent and for that reason alone the Indian would have treasured them. The form of *E* is certainly derived from the Pectunculus shell. *F* is 52 mm. long, 44 mm. at the widest part, and 13 mm. in thickness. *G* is 56 mm. long, 47 mm. at the widest part, and 15 mm. thick. These two are the handsomest examples of selenite pendants that the author has ever seen.

SHELLS

That marine shells of the west coast were used extensively all over the Southwest is evidenced by their being found in many different ruins in the various parts of that region. It is more than probable that they were brought in by barter, although there are well-defined traditions among the Pueblos of a pilgrimage to the "sky-blue water," during which the participants made a "journey of death" over a great desert. It is also probable that if these journeys were really made, quantities of marine shells were brought back and dis-

tributed to those who remained behind. The author, in 1919, brought from California a box containing a lot of waterworn abalone and other salt-water shells and presented them to his friends, who received them with expressions of great pleasure, and told him that they were very good luck, as coming from the "sky-blue water."

The excavations at Po-shu yielded a small amount of shell material. The Pectunculus, marked *H*, Plate 35, has a perforation at the top and running through the hinge of the shell. It was worn as a pendant. One of this type was found at Aztec. *I* and *J*, same plate, are only bits and their use is not known.

Coni of several varieties were found and were probably used as bells. They are marked *K*, *L*, *M*, *N*, and *O*, Plate 35. *K* is 26 mm. in length and 17 mm. at the greatest diameter. Both *K* and *L* are marked with purplish dots and lines. All of the others are of a sort of cream color and are not marked in any way.

Dr. Earl Morris describes the preparation of the Conus as follows: "Customarily, the spire of each shell was ground away until the point of the greatest diameter was reached. The remaining conical body whorl was perforated near the apex. A short distance back from the lip of the orifice a transverse groove was cut across the curving side of the shell and deepened until the wall was pierced sufficiently to allow a cord to pass through the opening. Suspended thus from the smaller extremity, these beads hung like bells from the supporting strand." [9]

POTTERY

The pottery found in the ruin of Po-shu presents one of the most perplexing problems of the whole excavation. Almost every type of pottery known and attributed to the pre-Spanish period of the Jemez Plateau is represented in the collection. Undoubtedly some of the wares are not native to this ruin and were brought in by barter or as gifts. It is still the custom of the Pueblo people to carry gifts of pottery to their friends in other villages where they go to visit. The representative wares of Po-shu, which are native to that place, are pretty well divided among the black coiled ware, the biscuit ware, and the incised ware. The ruin yielded a larger percentage of incised ware than has ever been found before in any one ruin. There are some queer, seemingly transitional, pieces showing influences from other locations. A suggestion of the San Juan and Rio Puerco forms occur, but in such a small percentage that it is hardly safe to conjecture that they were actually made at Po-shu, although in some cases the paste is the same as that of the local ware. During the excavation we were not able to find the clay beds from which they gathered their clay, but there must have been

[9] Morris, The Aztec ruin. Anthr. Papers, Am. Mus. Nat. Hist., vol. xxvi, pt. 1, p. 94.

several of these which furnished pastes of a different composition. Some of the pottery is made from a paste having a large content of gypsum, as is shown by the hardness and color of the pieces. The red ware is represented in a small proportion in the collection, although there was a much larger percentage of red sherds scattered over the surface of the ground than is shown in the reconstructed pieces. No red pieces were found whole. Forms and decorations of the red ware would indicate that they were not made at Po-shu, but were brought in from other places, such as Puye, Frijoles Cañon, and Frijolito. Sherds of coiled ware differ very much in hardness and kind of paste. No pottery with basket impressions was found. Taken as a whole, the pottery presents a great variety of form and decoration. Unique treatment of well-known designs and a certain boldness in the execution of the decoration often occur. If Po-shu was a late pre-Spanish pueblo we can in a measure account for the great variety of pottery of different periods which was found.

The distribution of the pottery of different periods was always the same in all the rooms. In the same room, on the same floor level, would be found coiled ware, black cooking ware, sometimes of the crudest type, biscuit ware, incised ware, and red ware. All types were represented. This did not occur in isolated cases but was the rule all through the ruin. The surface of the ground all over the ruin site was covered with tons of sherds of every type, and while at first it seemed that in some locations there was more of one kind of ware than another, still, after carefully studying the whole surface, it was concluded that while in a few locations one type might have a slight preponderance, yet as a whole the distribution was practically the same all over the site.

One phase of the distribution of the broken pottery was this: A portion of a pot would be found in one location and the missing parts would sometimes be found in an entirely different location. In the case of a red Puye piece, a large fragment was found in location 3, and two weeks later, at a distance of over 188 m. away, in location 7, the remaining pieces were found. The same thing occurred in several instances. Again we would find a fragment of a pot in one room and never find any more of it, even after searching with the greatest care the room in which it was found and all the surrounding rooms.

It is to be regretted that in a few cases only small fragments of most interestingly decorated pieces were recovered. Where there was any suspicion that anything interesting was in the room, all of the earth removed was screened at least twice and often three times through screens of three different sized mesh.

Only one medium sized and four large pieces were found whole. Seventeen small pieces were whole when found. There were very

few sherds of small pieces scattered over the surface of the ground, but tons of sherds of the large pieces.

There is no doubt that many of the smaller pieces were for ceremonial use, as their size would make them of no value for ordinary use. They were also too well made and decorated to have been toys for the children to play with. Several good specimens of the clays used in the manufacture of the pottery were recovered, and it would be interesting to experiment with them and see the results that might be obtained.

Clays and Pastes

Although no clay beds were found during the excavation, several excellent specimens of clays and pastes were found in the rooms. Some of these show plainly the type of pottery for which they were used.

A long leaf-shaped piece of creamy yellow paste, heavily mixed with mica, was undoubtedly intended for the making of the black coiled ware. The piece shows, roughly, the impressions made by the hands and fingers in rolling and kneading it into its present form. A bit of this paste was subjected to a smoky, hot flame for a few minutes and burned a deep black such as we find in the cooking ware. It is also possible that the mixture was used as a wash, as will be seen later when the incised pottery is dealt with. (Pl. 36, *A*.) One specimen is mixed with a large percentage of yellow ochre (pl. 36). This burns a beautiful red when subjected to a clear flame and may have been used as the slip or to make the entire red ware. The red ware in many cases shows red all the way through a fracture of the pot. A heavy mixture of yellow ochre in the paste for the red ware will give this result. The women of some of the Rio Grande pueblos make a ware with a red slip in the following manner: After a piece has been sun dried it is given a heavy wash of yellow ochre; when this wash is dry the whole exterior of the pot is polished with a polishing stone and then baked in a native kiln. Where the ochre has soaked into the pores of the pot, after burning, a fracture shows the same beautiful red as is found on the outside which was covered with the wash. An interesting bit of clay is molded into an oval with a band of nail indentations running around the middle of it and another line of indentations running over the top of one end. My first thought was that it was a ceremonial object of some kind, but upon showing it to one of the women of Santa Clara, who is an excellent potter, she smiled and, tossing it from one hand to the other, said that she had made many similar ones. To quote her: "You know that sometimes several of us (Indian women) get together and make pottery. After we are through with the serious work, we sit and talk and tell stories. We almost always have some clay left, and while we are talking and visiting we take a lump and play with it. Some women make funny

things, others just pat and play with it, making holes with their fingers or indenting it with the thumb nail. Sometimes the talk or story is most interesting and we sort of forget what we are doing and then, maybe, we make something like this lump. So you see that it really does not mean anything." (Pl. 36, *B*.)

One of the clays is heavy and greasy, very much like the old-fashioned "tailor's chalk" This is gray in color and seems to contain little or no sand and to be just as it came from the quarry. It may have been used as a base for some of the more porous pastes, with mixtures of sand, very fine quartz pebbles, or mica. Bits of the same kind of clay were also found in almost white and light yellow colors. The fine texture and soapy feel of these would indicate a very high grade of clay, which was no doubt used for the finer wares with a slight mixture of other materials.

A fairly large quantity of reddish-brown clay was found. While this is not as fine in texture as the clays described above, it is quite pure and seems unmixed with any foreign substance.

It contains a very small percentage of sand, which appears to belong with it in the natural state. None of the above mentioned were subjected to heat tests, as they seem to be the raw material before mixture.

So far as could be determined there were no traces that ground-up pottery was used as a temper. The only tempers observed were very fine white quartz pebbles and mica, if the latter can be called a temper.

From every evidence at hand it is safe to say that coiling was the only technique employed in the making of the pottery. Even the smallest pieces show some of this process.

Chronology of the Po-shu Pottery

The chronology of the Po-shu pottery as given in this paper is only tentative and may be at fault in some respects, but I believe that it is the best that can be given at present.

Period.	Percentage found.
Formative period (pre-Pueblo)	Very small per cent.
Late black and white	Very small per cent.
Hard coiled ware (grayish-black)	Only a few sherds.
Soft black cooking ware (coiled)	Large per cent.
Biscuit ware (black decoration)	Early types: Undecorated and crudely decorated; very sandy paste. Middle types: Better decorated; paste better. Late types: Good decorations and good paste. The entire biscuit-ware group is represented in large per cent.
Incised ware, strong paste	Large per cent.
Red ware with black glazed decoration	Fair percentage on the surface, smaller in the rooms. Probably not native to Po-shu.
Two-colored red ware with black glazed decoration.	Very small per cent. Probably not native to Po-shu.

As has been said before, the percentages of black cooking ware, biscuit ware, and incised ware are almost equal, and by taking into consideration the sherds of red ware with black decoration which were found on the surface, this ware was also well represented.

In considering the wares of Po-shu it is necessary to remember that there were no stratified areas to assist in determining the sequence of the pottery, as all types were found on the same floor level and in the same room.

PRE-PUEBLO WARE

There are two whole pieces and a number of sherds that do not seem to belong to any of the well-defined types of the Jemez Plateau pottery. (Pl. 37, *A*.) Their crude construction and inferior paste appear to set them aside as the forerunners of the biscuit ware. In general appearance they are very much like sherds and whole pieces found on the Mesa Verde during the summer of 1919 by Dr. Fewkes and Mr. Ralph Linton in ruins ascribed to the "slab-house" period. Mr. Linton, who saw these specimens, said that in every way they appeared the same as those found in the "slab-house" ruins, and until more of this material is found it might be well to let it stand as such. They are certainly not the ordinary black coiled ware, being of a dull grayish-yellow color, although the paste of the sherds has turned a deep black from the firing or from being subjected to a great heat in the destruction of the ruin. On account of the finding of the above-described pieces it seems proper to give this ware an earlier place in the chronological sequence than the black and white. It may correspond to what Dr. Earl Morris calls the pre-Pueblo of the San Juan.[10]

The type must not be confused with the plain undecorated ware that will be described later and which, though not incised, is closely allied to the incised ware in paste and general appearance.

LATE BLACK-AND-WHITE WARE

This ware is represented in the collection by two pieces very similar in form. Both are miniature water jars. Plate 37, *D*, has a stepped design running around it which is strongly suggestive of some of the San Juan step designs and yet may be the forerunner of a similar design which occurs so often on the later biscuit ware. In the biscuit ware the stepped figure is usually inside of the triangle with the two corners filled with black; in the piece under consideration there are no triangles and the steps are either suspended from or mounted on lines running all around the jar. The jar is 55 mm. high and 54 mm. in diameter. The general color is a dirty white with black decoration that has a suggestion of reddish brown in the black.

[10] Morris, op. cit., p. 107.

Plate 37, *E*, has a hatched design which is most common on the incised ware, only here it is painted instead of being incised. It is 54 mm. in height and 63 mm. in diameter. The black design is a jet black.

Both of these pieces are of a very hard paste and covered with a dirty white slip. Both have lugs, placed near the top and pierced so that a cord could be inserted for the purpose of carrying them or for hanging them up. There is no reason to suppose that they were not made at Po-shu, and yet they are so old a form and general type in decoration and color that the fact of their being found there would indicate an antiquity for the ruin that is not borne out by other facts. There is also a possibility that they were brought in from farther west.

HARD COILED WARE

Closely allied to the late black and white, and probably contemporaneous with it, is the blackish gray coiled and indented ware. These two are always associated in the finds in the ruins of the Jemez Plateau and the Rio Grande Valley. Unfortunately up to this time no exclusive black and white ruin has ever been excavated. At Po-shu the hard coiled ware is represented by a few sherds, some of which are marked with thumb indentations, some with stick indentations, and some showing the coil. They are all very hard and of much better paste than the later black cooking ware. (Pl. 37, *I*.)

Duck or Moccasin Shape

Two of these eccentric forms are in the black coiled ware. The paste is somewhat harder than the late black ware and still not as hard as the early black ware. To what use the vessels were put is not known. In the smaller ones, which are not uncommon in certain localities and which occur principally in the black and white ware, we sometimes find traces of grease and the sides and rim are burned. It has been suggested that these were used as lamps, but that would hardly hold good in the case of the ones from Po-shu. There is one from this ruin in the biscuit ware; this is decorated with birds (see fig. 33) and has lateral wings. The head was gone and no attempt has been made to restore it. These are all shown on Plate 38.

Pinched Ware

There is only one piece of pinched ware in the collection. The author has never seen another specimen of the black ware treated in this manner. The paste is very hard and seems to belong to the early gray-black coiled ware. In making the embellishment of the pot, instead of incising or showing the coils the potter has pinched the clay along the upper sides of the pot and this has given a

unique decoration. It would be interesting to find more of these pieces and see how far the art was developed. (Pl. 37, *F*.)

BLACK COOKING WARE

The black cooking ware and the biscuit ware were probably contemporaneous and there is no good reason for placing the one before the other. The only reason for connecting the sequence in this way seems to be that the black cooking ware appears to be a degeneration of the older and finer grayish-black coiled ware, just as the biscuit ware appears to be a degeneration of the older black and white. In considering this degeneration, if it really is such and not a complete change, we must take into consideration the differences in clay, design, and form. Local environment, different kinds of clay, and possibly a certain amount of carelessness due to migrations and difficulty of transportation, any or all of these may be important factors in the degeneration change in the pottery. The black cooking ware is represented in the collection by large pieces only. There is no doubt that there were smaller pieces in use, as is indicated by the sherds found, but not enough of any one pot was found to warrant its reconstruction. All of those recovered show traces of soot and discoloration from fire and thus indicate their use. (Pls. 39, 40.) The largest one found is 36 cm. in height and 30 cm. across the top. (Pl. 39, *A*.)

There are two more pieces of the same ware that do not show any traces of fire or soot. The largest of these is a water jar of a typical Po-shu form, rather squat, with a sharp shoulder, and was found beneath the floor of a room, apparently having been used for storage purposes. The other one is smaller, with the same type of shoulder but fuller bottom and flaring mouth. It was found in a similar position to the one first described and was also used for storage.

All of the black cooking ware has considerable mica in the paste as well as a quantity of sand. This makes a pot that at present is soft and crumbly, whatever it may have been originally. Possibly the constant use over a hot fire may have had some effect in taking the hardness out of the paste, or perhaps the long burial in the ground may have caused it to deteriorate. This is apparent in the two pieces that were used for storage and not subjected to constant use over the fire. They are decidedly harder than the regular cooking pots, notwithstanding they are made of the same material.

BISCUIT WARE

Dr. Kidder gives the following explanations as to why he has called this pottery biscuit ware: "This pottery, so characteristic of the ruins of the Pajarito and the northern Rio Grande culture as a whole, is distinguishable from all other light-colored wares by its peculiar

yellowish and grayish tone and by its lightness and softness. The paste is usually yellowish gray, homogeneous in structure, somewhat granular, and in most specimens a trifle porous. The majority of sherds contain no tempering material, but where it does occur it consists, in all of the pieces that I have examined, of bits of water-worn quartz three-fourths to one mm. in diameter. The visible surfaces of all vessels are coated with a slip varying in color from almost lemon yellow to dark gray. A light gray is perhaps the commonest shade; pure white is never seen. While the slip is apparently incapable of taking a high polish, it was evidently always worked over with the rubbing stone. The decoration is in sharp, clear, black paint, much less variable in color than that of black-and-white ware; it is quite lusterless and therefore entirely distinct from the glaze paint of the red ware." [11]

As will be seen by reference to the chronological sequence, the biscuit ware has been subdivided into three groups in this paper. It has sometimes been argued that because a piece of pottery was crude, badly made, and of inferior paste, it does not necessarily follow that it is of an earlier type, but the great improvement in material, decoration, and finish of the biscuit ware is so marked that it is fairly safe to assume that the poorer made pieces preceded the better ones, and it is upon this assumption that the subdivisions were made. It does not necessarily follow that any great period of time elapsed between the cruder and the better made ware.

Before taking up the first group it will be necessary to consider some of the sherds and one small whole piece which seem closely related to the earliest types of the true biscuit ware. The two pieces are fragments of the bottoms and sides of very small bowls. The paste of these is very sandy, but contains no mica or other temper. Both show, more or less, the coiling, but no marks of fire or soot. They are in every way different from the pre-Pueblo pieces and seem to bear a direct relation to the biscuit ware. Neither one has a slip or outside wash and both are very crude. The only whole piece in the preliminary group is a small bowl 55 mm. in height by 11 cm. at the largest diameter. (Pl. 37, *H*.) The paste is typical, very sandy biscuit. It is porous and bears the marks of fire on the outside. Whether it was once decorated or not can not be determined now, as all traces of a decoration, if there ever were any, have been effaced. In form it is similiar to the smaller pieces of incised ware and biscuit ware. Whether these specimens were forerunners of the biscuit ware or only crudely made pieces of it we have no way of telling at present, but I have thought it worth while to consider them first as compared with the first subdivision of the true biscuit ware.

[11] A. V. Kidder, Pottery of the Pajarito Plateau. Mem. Am. Anthrop. Asso., vol. II, pt. 6, pp. 419–420, 1915.

Early Types

In the first group we find a very soft, sandy paste, without temper, and which often crumbles when put in water for any length of time. In fact, some of it is so soft that it is impossible to repair it, as it pulls away from the glue. In this class have been placed two whole bowls and two which are in a fragmentary condition. All of these are covered with a very light colored slip or wash. The so-called flag design (pl. 41 *A*; fig. 4) occurs on three of them and the fourth (pl. 41, *B*) is decorated with a number of heavy, thickly drawn lines which seem to have no special significance. All of them are thick in comparison with their size and are rather clumsy to handle. The coloring matter used in decorating them is very good, and is jet black without any suggestion of brown or red. There is, with one exception, no attempt at any of the more intricate designs of the later biscuit ware. The exception occurs on the outside of one of the fragmentary ones and shows, in such portions of the panels as remain, variations of the step, double line with dots between, and other elements of the typical biscuit decoration. The other fragmentary bowl is decorated with a design that resembles a tree running horizontally around the inside and in two sections. The difference between the pieces in this group and the next is very slight.

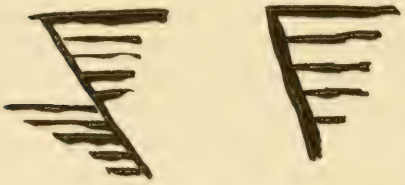


Fig. 4.—Flag designs.

Middle Types

Small pieces.—This part of the group is made up of six whole bowls, two halves of bowls, two small pots, and a fragment of an oblong paint dish. Here we have a slightly better paste and more of a rubbed finish on the pieces, while the designs show a great variety in technique and concept. The technique is still rather crude and but few of the characteristic design elements appear. Plate 37, *K*, is a jug that has a single flag design, which occurs three times, inclosed in a separate panel each time; all of the panels being connected with a continuous line, top and bottom, running horizontally around the jug. It is 59 mm. in height and 76 mm. at the largest diameter. It is rather graceful in form but a little thick and clumsy. There are two holes near the top for suspending or carrying it. The color is a very good gray, the decoration black.

Plate 37, *G*, is a small pot with a large mouth. The lower portions of the sides belly out as they reach the bottom. The decoration is two variations of the step design, one of them in outline and the other filled in solid. The surface is fairly well polished and the black

decoration a good color. The general color is a yellow undertone, becoming pronounced toward the top, and a slight overtone of gray toward the bottom.

Those on Plate 41 are small bowls averaging 95 mm. across the top and 38 mm. in height. These have unique decorations consisting of dragon flies, crosses, and snakes (see fig. 12, *B*, *D*). All of them have lips representing the four cardinal points and were ceremonial in character. Plate 41, *H*, is decorated on the exterior with five crosses or stars running horizontally and almost equidistant around the bowl. In the interior are four snakes and two dots. The snakes run perpendicularly from the bottom to the lip of the bowl; general color is gray with a yellowish undertone. Plate 41, *F*, is a bowl having four dragon flies on the exterior between the lips. These are large and a little out of proportion to the rest of the bowl. In the interior, running horizontally near the bottom, are two snakes and in the middle of the bowl a small cup with a raised rim around it. The general color is a pinkish yellow. Plate 41, *D*, is another bowl with three dragon flies inside in a row. One of these is in the middle of the bottom, and the other two run from the bottom a little way up the side. All of them are placed horizontally with the bowl. Outside are two dragon flies placed in the same manner as those inside. The general color is gray, with a suggestion of yellow undertone in places.

Plate 41, *I*, is a bowl 102 mm. wide and 32 mm. in height. On the exterior are painted four lines running horizontally around the bowl without a break in them. In the interior, in the bottom, is a badly drawn circle with five trees superimposed, badly spaced and crudely painted. Between two of the trees is an animal or bird, the head somewhat resembling a duck with an elongated neck; the body is indefinable, and from beneath one end of it project two legs with the feet turned backward. Whether this was intended for a beast or a bird it is impossible to tell. The general color is a dirty yellow.

Plate 41, *G*, is a bowl with interior decoration of two flags and two panels. The latter are especially interesting in that they suggest a step in the evolution from the single flag design to the oblique line which so frequently occurs in all of the panels of the biscuit ware. There is also a curious figure in the bottom of the bowl. On the exterior is a single flag, a checkerboard, and a figure of an oblong square divided in the middle by a horizontal line, the upper half again being divided into two oblong squares by a perpendicular line. All of the figures, both inside and outside, are joined by continuous horizontal lines running above and below them. The general color is gray with a pinkish yellow undertone.

Plate 41, *C*, is a bowl 114 mm. in diameter by 68 mm. in height. The design is interesting in that it is totally different from anything which has been considered under that head in this paper. The exte-

rior decoration consists of two rows of irregular triangles running horizontally around the bowl. One row of triangles is suspended from a continuous line near the top and the other row is superimposed upon a similar line around the bottom. The tips of the triangles join in an irregular fashion and make a design which is frequently seen on the modern pottery of Santo Domingo, New Mexico. (Fig. 5, *A*.) In the interior is a cross composed of a series of crosses one within the other. The four arms extend from a square in the bottom, reaching to the rim of the bowl. As each series of lines reaches the highest point, near the rim, they are joined by horizontal lines, thus making crosses within crosses. (Fig. 5, *B*.) This bowl has a decided pinkish yellow undertone and very little of the gray overtone. The black coloring matter of the decoration is inferior to that of most of the other pieces.

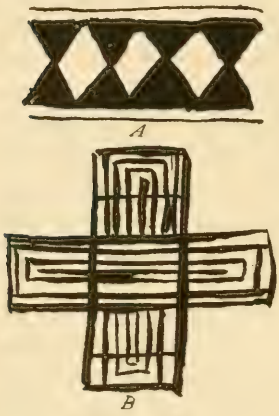


FIG. 5.—*A*. Exterior decoration on small biscuit bowl. *B*. Interior decoration on the same bowl.

All of the small pieces in this group are thick and clumsy, and while the paste is somewhat better, and the decoration more extensive than that of the first group, they are not to be compared with the finer pieces of the final group.

LATE TYPES

In this group are placed the finest of all the biscuit ware found in the ruin. The material is all very good for biscuit type, being in some cases quite hard. Most of the pieces have a fine finish and are well decorated, although some of the designs are drawn with a bold, free sweep that is remarkable and displays originality. Most of the large tubs show much wear and the polish has somewhat disappeared on some of them, but this does not detract from the workmanship and beauty of the pieces.

Small bowls.—Plate 37, *E*, is a small-mouthed jar that was probably used ceremonially. It is 43 mm. in height by 98 mm. in diameter at the largest part. The form is a miniature reproduction of the larger water jar. There are three figures of centipedes running around the jar. Above and below these figures there are two unbroken lines encircling it. Below the lower lines and running perpendicularly from them are three groups of three straight lines each.

Plate 41, *E*, is a small bowl, well polished and slightly crazed. It is 8 mm. in height and 102 mm. in diameter. It has four lips at the cardinal points. The interior decoration is a cross, the four arms of which rise from the bottom and extend nearly to the rim of the bowl. In the center where the arms are joined the space has

been left vacant, but each arm of the cross has been subdivided into a series of squares and blocks that are very difficult to describe. (Fig. 6.) The exterior decoration consists of two lines running horizontally around the bowl. The space between these two lines is cut up by perpendicular lines forming unequal squares. Above these lines, in three instances, there are two short perpendicular lines on each side of the lip in the rim. In the fourth instance there are three lines instead of two. The general color of the bowl is gray. This piece is almost the only one that has crazed. This may have been caused by a faulty slip or wash. Crazing as seen on this piece seldom occurs on the biscuit ware, although it is often seen on the modern ware.

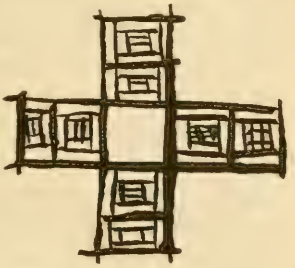


FIG. 6.—Interior decoration on small bowl.

Plate 42, *B*, is one of the handsomest bowls in the whole collection. It is 45 mm. in height and 140 mm. in diameter. The paste is very hard and suggests that gypsum may have been used as a base and temper. There is evidently very little sand and no quartz pebbles in the paste. This piece was in fragments when found and the fractures showed a color of paste which was not seen in any other piece from this ruin. The color, a soft gray, was more like that of the late black and white and for a time it seemed that it might belong to that group, but a closer study of the bowl finally placed it in the last group of biscuit ware. This decision was arrived at by the typical fine wash of the better biscuit ware with which it is covered. The outcurving rim is very unusual in the Jemez Plateau and in some ways is similar to the rim shown by Dr. Kidder and classed by him as Kayenta ware. He says that this is one of the commonest types of rim from that locality.[12]

The manner in which the wall of this bowl rises from the bottom is decidedly different from the Kayenta ware, but the rim is the same.

FIG. 7.—Mountain and cloud decorations.

The decoration in the interior is unique. In the bottom are two irregular circles; attached to these and rising with the wall to the inside of the outcurving rim are four groups of mountain or cloud symbols. (Fig. 7.) These are outlined by irregularly drawn black lines. Running around the rim are four snakes with well-defined heads. The exterior decoration consists of four nicely drawn dragon flies.

[12] Kidder and Guernsey, Archæological explorations in Arizona, Bull. 65, Bur. Am. Ethn., p. 132, 1919.

The general coloring and appearance of this piece is rather puzzling. The grayish slip gives it a general tone that is not like the biscuit ware and yet there are spots of the typical yellowish undertone which occur so often in that ware. Having seen from the fractures that the paste is gray and the slip is gray, it is difficult to account for the undertone in any other manner than that it is a stain from the earth in which the bowl was buried and which has soaked through the slip where it was worn thin before burial.

Plate 43, *E*, is another curious piece, undoubtedly ceremonial. It is 48 mm. in height and 54 mm. in diameter. This specimen is roughly divided in the interior into four sections or compartments. The dividing walls are very thick in proportion to the rest of the pot. There are four lugs with holes in them for suspending or carrying the pot, attached to the outside of the wall opposite each inner dividing wall. There are broad black bands with a sort of wavy effect running around the outside and these comprise the whole decoration. The whole pot is rather crude in form, but the black of the decoration and the paste are excellent.

Plate 37, *J*, is a small bottle with two handles on the outside opposite each other and well up on the shoulder of the piece. It is 90 mm. in height, 102 mm. across the bottom. The opening of the mouth is 44 mm. in diameter and has an outcurving rim. The bottle is rather full bellied and flat on the bottom. The form is not a biscuit-ware form and resembles those of the San Juan drainage more than anything found in the Jemez Plateau or the Rio Grande country. This piece is more or less sophisticated. The paste is biscuit of the finest type. A companion piece is Plate 44, *A*. This is also a bottle. It is 128 mm. in height by 140 mm. at its greatest diameter, with a mouth opening of 51 mm. It is even more full bellied than the preceding piece and also has a flat bottom. In place of handles it has two holes pierced in the neck for attaching cords. The rim is only slightly outcurving. The general form of this piece suggests the Apache water bottle. The paste is very fine grained and hard. The slip of both of these pieces shows a slight undertone of yellowish pink. Like the preceding one, the decoration consists of black bands running horizontally around the bottle. The lines are not well drawn, but this might be accounted for by the difficulty of making them on the rotund form of the bottles.

Plate 43, *C*, is perhaps the most unique specimen of pottery in the collection. As nearly as can be described, the form is that of a round doughnut with the usual hole in the middle and having a long oval mouth with raised walls set on top at one end of it. The largest diameter of the bottom is 165 mm. The tubular body averages 38 mm. in diameter. The raised walls of the mouth average 20 mm. above the rest of the piece. A part of these walls is gone. Originally

it was covered with a heavy pinkish yellow slip which has in a great measure disappeared. The ware is unquestionably biscuit and of a very fine paste. The decoration consists of a centipede on the top; the head of this has been so far effaced that it can no longer be seen. Around the sides and coiling up onto the walls of the mouth is a double line with dots in the space between. Whether this was a snake or not can not be determined at this time, as part of the wall which might have had a head painted on it is now gone. The top and bottom are rather flat while the sides are slightly rounded.

Mr. Sam Eldot, of San Juan, N. Mex., has a companion piece to this one which was found in this same ruin by Mr. Adolf Bandelier in the early eighties. It is somewhat smaller than the specimen just described, being only 102 mm. in length and 38 mm. in height. It is a very good grayish color without any undertone of another color. The decoration on the sides is the same as on the first one described, but the top design is different. First, there are two groups of three lines placed obliquely; from the top of these three lines is a single line running from them at an angle of about 45°; the third group is a variation of the crook which is found so often on the biscuit ware. (Pl. 43, *A*, *A*.)

The form of both of these specimens is strongly suggestive of the Rio Puerco culture of Arizona, although the paste is a local one. The use of these cups will be considered under the head of the shrines of Po-shu.

FOOD BOWLS

There are four food bowls in the collection, showing a variety of decoration that is remarkable. While three of these are of the accepted biscuit ware, there is one which is unique both in paste and decoration. The forms are of the usual type with incurving rim. The sides vary from the well-rounded curve to the long sloping curve with a sort of shoulder.

Plate 45, *B*, is unusually fine. The long sloping sides and sharp incurve reaching to the rim are very good. It is 27.5 cm. in diameter and 11.4 cm. in depth. The whole appearance of the bowl indicates that it was made by an artist. The paste is hard and with a small percentage of sand. The slip is the typical gray with a heavy undertone of pinkish yellow. The interior decoration consists of one heavy circular line in the bottom, above which is a series of three circular lines with eight groups of diamonds, each group consisting of three diamonds one within the other. Inside of the interior diamond, top and bottom, is a sort of three-leaved design. Above the diamonds are again three circular lines. The diamonds are attached to the lines above and below. The rim is decorated with short, heavy black lines running from the inside to the outside. The exterior decoration consists of four panels not separated by intervening lines.

The conventional crook and the filled corner triangle and oblique lines are all used in this decoration. All of the work is well done and of good color.

Plate 46, *A*, is 26 cm. in diameter and 9 cm. in depth. In the middle of the bottom is a slightly raised mound which indicates that a mold was used to start the pot. Both interior and exterior are decorated with variations of the triangle and oblique line designs common to the biscuit ware. There are three panels inside and four outside. The paste of the bowl is excellent, although the design is not as carefully done as on some pieces. (Fig. 10.)

Plate 45, *F*, has long curving sides followed by a sharp incurve and then a straight rising from the incurve. (Fig. 10.) Set on the incurve on opposite sides are handles. One, an ordinary one such as is sometimes found on the biscuit bowls, is not unusual; the other, a combination of handle and extra small bowl, is not seen often The small bowl on the side is 2 cm. in width, 3 cm. in length, and 1 cm. in depth. The function of this little bowl on the side is not known, but the fact that the specimen was found in a room containing many ceremonial things would suggest that the whole bowl was for ceremonial purposes. The large bowl is 23.5 cm. in diameter at the rim and 95 mm. in depth. The interior decoration consists of one heavy and two lighter circles. Above these are four panels with step, filled corner triangle, and oblique lines. Above these again are three circular lines, and above this on the inside of the rim is a running band of wavelike lines. The rim itself is decorated with black dots. The exterior decoration is a series of four panels all alike, and one small extra one, which is a variation of the four. The same steps, filled corner triangles, and oblique lines occur in all of them excepting the small one. (Fig. 10.)

FIG. 8.—Turtle.

Plate 45, *G*, at first appears to be old Hopi and also has a suggestion of the Mimbres ware. It is a bowl 19 cm. in diameter and 76 mm. in depth. It has a decided incurving rim with round shoulder. The interior decoration is a turtle and two birds perched on trees. The head of the turtle has been restored from a drawing shown in Dr. Kidder's paper on the Pajaritan pottery. Across the back of the turtle is a cross of double lines with dots between them. Branching off from the spaces between the hind legs and the tail are

trees with birds perched on the top of them. (Fig. 8.) Whether there were other figures above the head it is impossible to say, as that portion of the bowl was not found, despite a strenuous search for it. All around the rim are dots. The exterior decoration is composed of three large and three small double flags.

While there is no reason to suppose that this bowl was not made at Po-shu it certainly shows some outside influences. Only a very

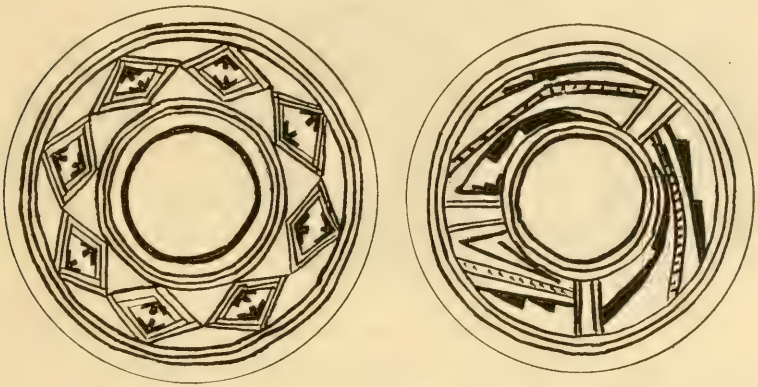


FIG. 9.—Interior and exterior decoration on biscuit ware tub.

few pieces of this type have been found on the Jemez Plateau. These were at P'otsuwi (Otowi) and at S'ak'ewi (Sankewi).

FRAGMENTS OF FOOD BOWLS

Figure 11, *C*, is a large fragment with flag decoration in the interior. The lines of the flag are blocked at the end and do not stream as in

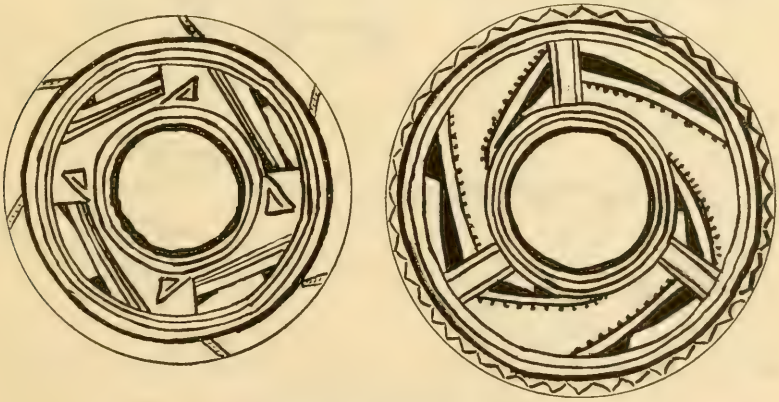


FIG. 10.—Interior and exterior decoration on biscuit ware tub.

the unblocked pattern. The flags occur four times. The exterior decoration is a series of two lines with dots between and running between two series of circular lines around the bowl. At the shoulder, which is sharp and incurving just below the incurving rim, is a very

heavy black line, and perched on this were birds. The most of the rim is gone, but one bird is still to be seen. This bowl is very hard biscuit ware and apparently contains considerable gypsum. The slip must have been very hard to take the fine polish which is still in evidence.

Figure 12, *A*, a large dark gray fragment without any undertone, is very interesting. There is no interior decoration to be seen and

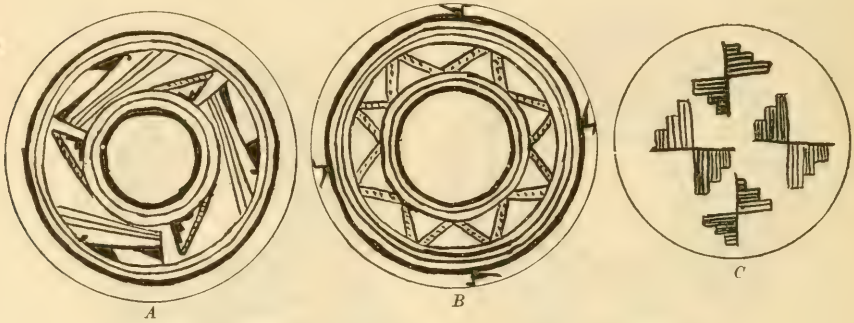


FIG. 11.—Interior and exterior decoration on biscuit ware food bowls.

from the shape of the bowl there probably never was any. The exterior decoration is that of a centipede. Part of the tail and part of the head can still be seen. Whether there was more than one centipede or not can not be stated, as a large part of the sides and rim are gone. The shape of the bowl is different from the others. The sides slope up in a curve to about halfway from the top, and

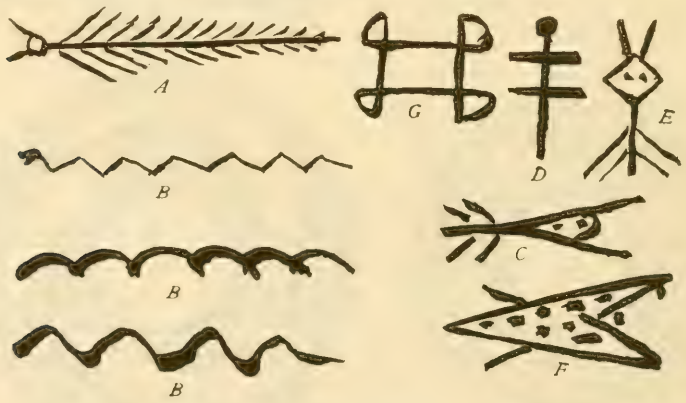


FIG. 12.—*A*. Centipede. *B*. Snakes. *C*. Fish. *D*. Dragon fly. *E*. Head of centipede. *F*. Fish. *G*. Spider woman (Navajo).

then curve in rather sharply. The part above the curve is almost equal to the part below it. Usually the sharp angular curve occurs higher up the side. Below the centipede are three lines running around the bowl. Below these are three lines running perpendicularly from the bottom.

Figure 12, *C, E,* is a sherd of what was probably an oblong bowl. This may not properly belong to the food-bowl class but has been inserted here for the sake of convenience. The exterior decoration, what there is left of it, is a portion of the head of a centipede and a fish. The interior is a portion of the step design so often seen on the red ware. The fragment is badly damaged by fire.

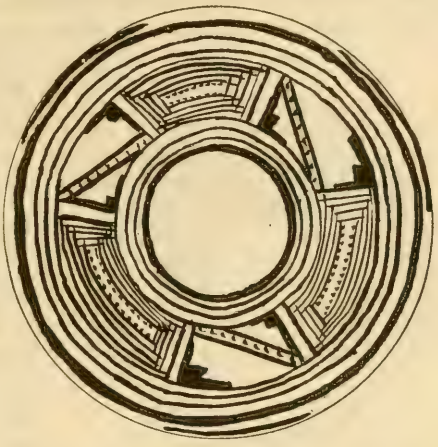


FIG. 13.—Interior decoration on biscuit ware tub.

Figure 12, *G,* is about half of a small bowl. Only a part of the design on the fragment can be made out. It is a square with triangles at the corners. This is often called by the Navajo Indians the "spider-woman" design and occurs on many of their blankets, as well as on some of the baskets made for them by the Paiute and Apache. The exterior decoration is a variation of the step, filled corner triangle, and dotted line design. The paste is very hard for biscuit ware.

A small fragment of a bowl with part of a most remarkable design is interesting. From the little that is left it seems to be a design consisting mostly of curves and suggesting old Hopi designs. The

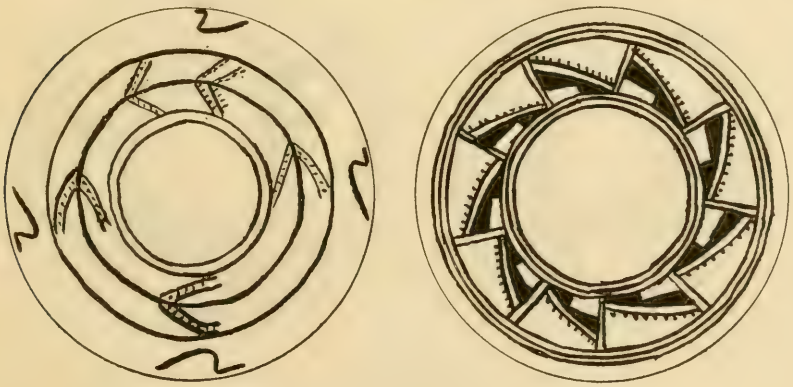


FIG. 14.—Interior and exterior decoration on biscuit ware tub.

shape is not Hopi but typical biscuit ware. There is too little of the bowl to attempt an extended description of it. The material is hard, porous biscuit paste, with a good, heavy slip. The general color is gray in tone with a slight pinkish undertone.

TUBS

The larger bowls or tubs from Po-shu present a variety of decoration ranging from the ordinary motives found on the biscuit tubs to some that are unique and have not been encountered before.

Figure 13 shows a unique design in the interior of a tub. There are three panels of oblong squares composed of several lines and having inside of them a series of dots. This gives them the appearance of dominoes. There are also three panels of filled corner triangles and oblique lines running across the panels. The exterior decoration is the crook and filled corner triangle.

FIG. 15.—Avañu interior decoration on biscuit ware tub.

Plate 46, *F*, has perhaps as unique a decoration in the interior as there is in the collection. Running around the bowl, about midway up the side, is a black line, and from this line springs what may be interpreted as growing corn. Above this is another line and around the inside of the rim are four figures which were intended for birds. The exterior decoration is made up of nine panels with an unusual treatment of the dotted line and filled corner triangle. (Fig. 14.)

Plate 46, *D*, has excellent types of the Avañu head on the exterior;

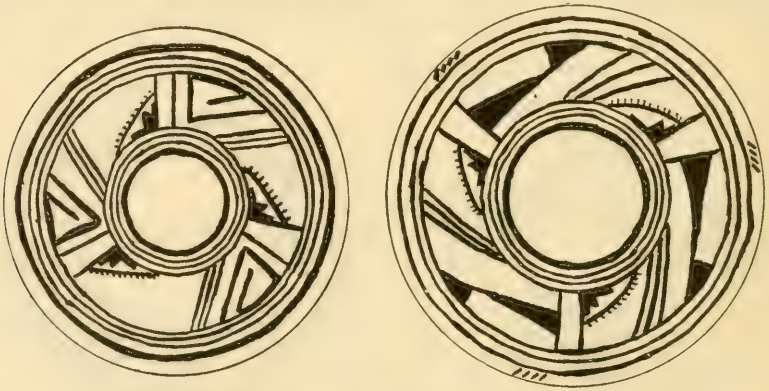


FIG. 16.—Interior and exterior decoration on biscuit ware tub.

also four panels of the filled corner triangles and three oblique lines. This is a particularly handsome specimen. The inside decoration is composed of a series of panels with the filled corner triangle and oblique line and dots.

Plate 46, *C*, is unusually beautiful in the treatment of the design, which is conventional, but executed in such a bold and free-hand

manner that it suggests that the artist who painted it was somewhat of a genius. At first appearance it seems amateurish, but a careful study of this piece shows skill and artistic feeling. (Fig. 16.)

Figure 17 shows part of a very handsome tub with a typical Avañu in the bottom. It is to be regretted that only a part of this specimen was recovered, but enough of the fragments were obtained to reconstruct a large part of it, and thus give a good idea of what the tub originally looked like. It is especially handsome and well made. The paste is very fine and hard and of the finest grade of biscuit paste. The color is the typical yellow of the fine biscuit with very black decoration.

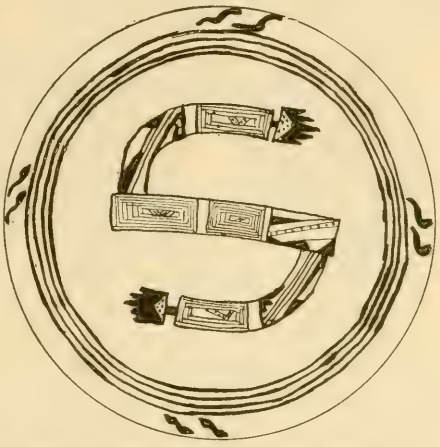


FIG. 17.—Avañu decoration on biscuit ware tub.

Plate 45, *D*, is another interesting sherd. The decoration is different from anything ever found on the Jemez Plateau and suggests the Hopi pattern. The broken circle or horseshoe with the flags is not like any part or element of the biscuit ware. The fragment is part of the bottom of a large, heavy tub. The color is dark gray. (Fig. 18.)

FIG. 18.—Decoration on biscuit ware sherd.

LARGE WATER JARS

From the standpoint of elaborate design, hard paste, excellent finish, and beauty, the water jars are by far the best in the collection of the biscuit ware. While in many ways they are not greatly different from the water jars found all over the Jemez Plateau, yet those of Poshu have one distinctive feature that makes them easy to identify. This feature is the sharp incurve at the shoulder. There is also a little difference in the curve of the bottom and its relation to the shoulder. An idea of the variety of curves and shoulders may be obtained by referring to Figure 19, which shows one-half of the outlines of the principal water and storage jars found in the ruin.

There are two jars which are decorated very much alike with the design shown in Figure 20 and on Plate 47, *A*, *B*. Each one has variations of the filled corner triangle, step, and oblique lines, and as these designs have been described at some length it will not be necessary to go into detail. All of them are the yellowish gray tone and still show some of the original polish. The design is in a very good black and rather well done.

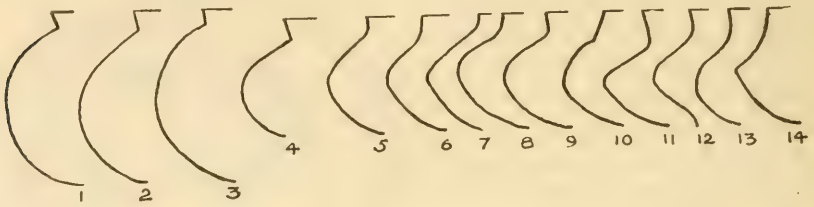


FIG. 19.—Unilateral profile of cooking pots and water jars.

One of the most elaborate and intricate designs shown is Figure 21 and Plate 47. This is so complex that the author will not attempt to describe it, but refers the reader to the figure and plate. The water jar shown as Figure 22 and Plate 47, *B*, is in general appearance suggestive of the ware that is sometimes found north of the Jemez Plateau, and is the only piece that is at all similar to the pre-Spanish pottery of that region. The grayish color and the treatment of the design is not like the ordinary pottery of the whole plateau.

FIG. 20.—Decoration on biscuit ware water jar.

INCISED WARE

While the type of incised ware found on the Jemez Plateau is not as well known as the biscuit ware it is just as important, and until the excavation at Po-shu there were not many good specimens to study. Po-shu yielded a large collection of very fine examples of incised ware, in whole pieces and in large sherds. In placing this ware in the position following the biscuit ware the author has felt justified by the hardness of the paste, the graceful forms, and the general fine appearance of the specimens. It would at first seem that they should precede the biscuit ware as an offshoot of the coiled and cooking ware, but the reasons stated before are too valid to suppose that it came before the biscuit. The paste is so nearly like that of the red ware, which is conceded to be the latest pre-Spanish, that there seems to be no good reason to doubt that it is the forerunner

of the red ware. Again, it might be argued that the simplicity of some of the patterns of the incised ware would give it an earlier place in the chronology. This would not necessarily follow. With the difference in paste and the difficulty of a new method of applying a decoration, it is natural to find pieces that are not so well made, just as we have seen that some of the biscuit ware is better than others. During the author's excavations on the Rio Oso, some years ago, he found some very elaborate designs in the incised ware. Some of these were wonderfully well executed and showed a finish that could only be obtained by long practice. On the Rio Oso most of the finer designs were composed of leaves and branches of ferns. At Po-shu they had evidently not attained such a high degree of efficiency and the designs are simpler. At Po-shu the incisions were applied to different sized pots and dishes. Some very handsome small pieces were found, and one water jar was taken out whole and is the finest specimen of incised ware that the author has ever seen.

FIG. 21.—Decoration on biscuit ware water jar.

FIG. 22.—Design on biscuit ware water jar.

Plate 42, *A*, is a small bowl. The sharp incurve at the top is typical of the incised ware and does not occur in the small pieces of the biscuit ware. The decoration is simple, consisting of triangles and oblique lines within the triangles.

The other designs in Figures 23–26 were taken from sherds that were found in the ruin and show some of the variations that were used.

The graceful form of Plate 44, *B*, makes a pleasing appearance and suggests that the piece is a copy of a large water jar with certain modifications. It is broader and not so tall as a water jar, but in the smaller piece these points seem to improve its general appear-

ance. It is surprising to see what a vast number of designs have been evolved from straight and oblique lines in the incised ware. There seems to be no end to what they might have done if they had continued to make the ware in the historic period. While, in some cases, the incisions are made in an irregular and crude manner, most of them are well spaced and done with great care. What the instrument was that they used to make the incisions we do not know. So far the author has had only one interpretation of the symbolism of the incised pattern. This is the one marked Figure 23 and Plate 48, *B*, and the informant, a Santa Clara Indian, said that it meant running water. The jar was in fragments when found and has been restored. (Pl. 48, *D*.) The form is very graceful, with a large, very open mouth, and the informant said that it was used to catch water in a stream, the water being intended for ceremonial purposes, and must therefore not be touched by the hands, and that is the reason why the mouth is so large. It was not buried under the floor, as was the case of so many of the large vessels.

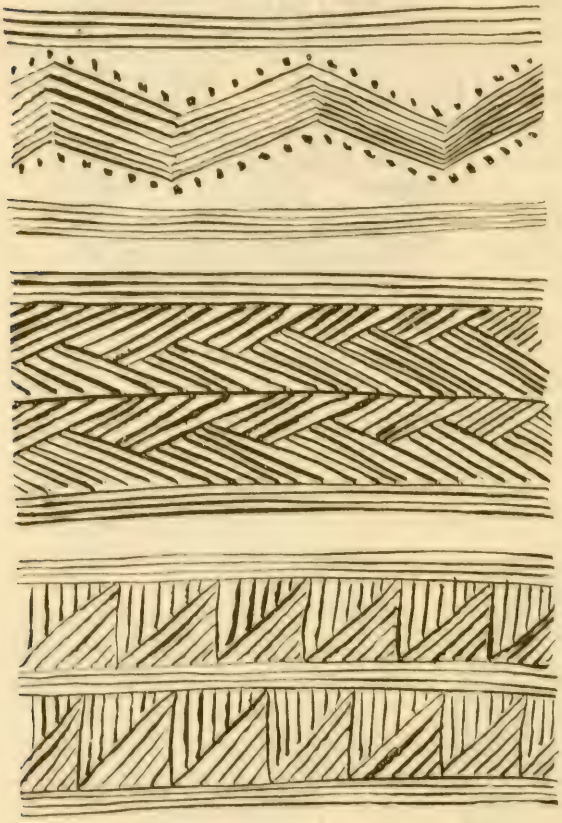


FIG. 23.—Incised designs.

The water jar shown in Plate 48, *C*, is the one which was taken out whole. It has the typical Po-shu shoulder and bottom. The paste is a chocolate brown color and the whole exterior of the pot is covered with a wash containing a large percentage of mica, which gives it a grayish tone. The whole of the interior has been polished (fig. 24), as is always the case with incised ware. This peculiarity in itself seems to relate the incised to the red ware, as the red ware is always finished inside much better than the biscuit ware.

One of the most curious pieces of incised ware, both in form and design, is in the collection of Mr. Sam Eldot, of San Juan, N. Mex. This is another one of the specimens obtained by Mr. Adolf Bandelier at Po-shu. It is a cylindrical box, sealed at both ends. One end is flat and the other rounded. The handle is a most unusual one for the Jemez Plateau and the whole form suggests the cups and mugs found in the San Juan drainage. The color is chocolate brown and the piece was nicely polished. On one side is an aperture with raised lips. This is too near the handle to make it practical to drink out of the aperture. It has been suggested that it was a canteen, but the fact that one could not easily drink out of it would tend to discredit this supposition. It is 19 cm. in height and 12 cm. in diameter. (Pl. 43, *B*.) Another incised piece in the same collection is a mug of typical San Juan drainage form. It is of the same chocolate brown color and the incised design on the side is a very common one. The handle is gone, but is indicated by the dotted lines. (Fig. 27.) The form of this mug is so different from anything yet found on the Jemez Plateau that one can only think that it was made by some potter who was not a native of Po-shu and who was at that village for a time. Unless the people of Po-shu had seen one of these mugs in some other locality the above supposition would hold good. The mug is 18 cm. in height by 23 mm. at the broadest part.

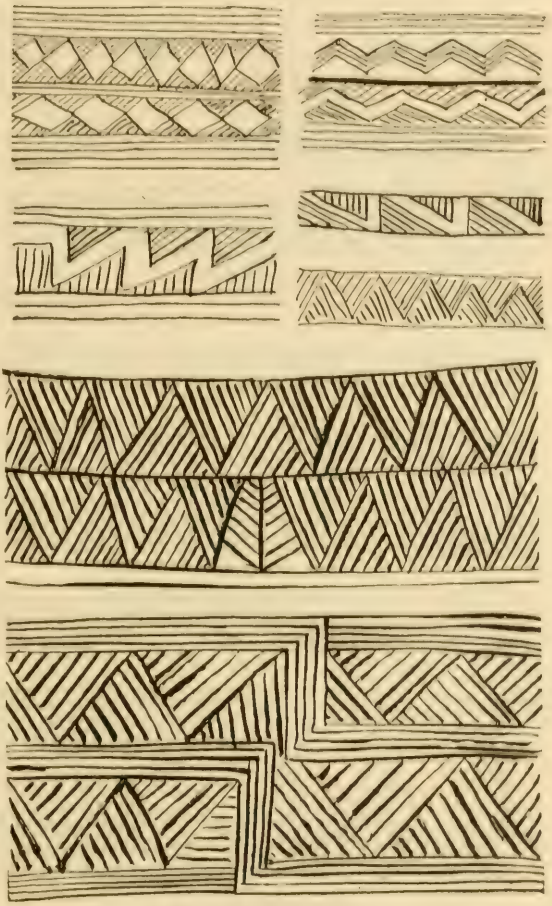


FIG. 24.—Incised designs.

RED WARE

The specimens of red ware found in the ruin probably are not native to the place. So far there is no evidence that the red ware was made much farther north than at Puye and Shufinne. At the former place and through the central parts of the Jemez Plateau the red ware seems to have reached its highest development. The red ware was one of the latest if not the latest pre-Spanish pottery made on the Jemez Plateau. It is even claimed by some that it extends for some time into the historic period. There is still a red ware made in the upper Rio Grande pueblos, but this does not compare with the earlier kind. All of the pre-Spanish red ware is very hard and is decorated with a glazed pattern. The glazing material is said to have been a salt solution. Whether it came to the potters as a matter of accident or whether they really discovered and used it, knowing what they were doing, we do not know. Small pieces were more frequently made than the larger pieces. In the Frijoles Cañon, Puye, and the intermediate ruins the red ware is fairly abundant, but north and south of these points it is more the exception than the rule. The smaller pieces are mainly ceremonial pieces, food bowls, and paint bowls; the larger pieces are usually water jars. At Po-shu we found enough sherds to restore four pieces.

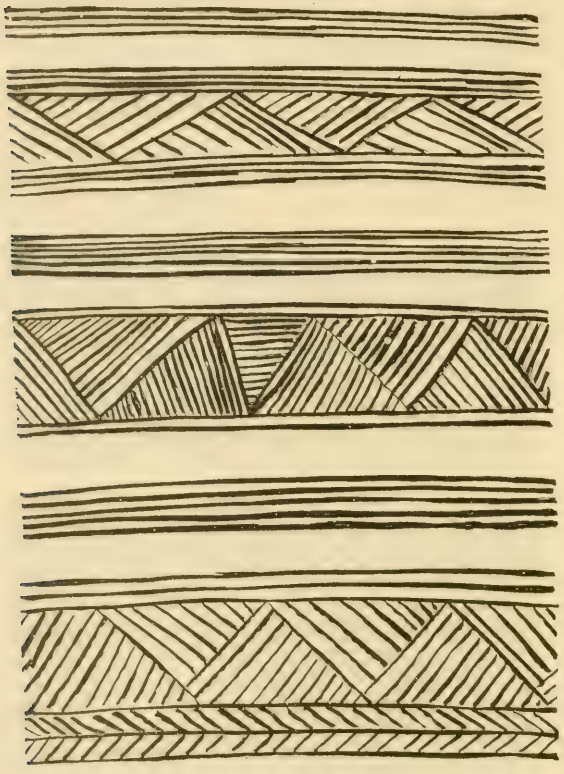


FIG. 25.—Incised designs.

Figure 28 is a food bowl about 28 cm. in diameter. It has been badly burned and the design is not very distinct. As is often the case, the glazed decoration has run in places and gives the appearance of having been put on carelessly. Whether this running of the

glaze was accidental or not we do not know, but it occurs on almost all pieces of the ware. Figure 29 and Plate 46, *B*, is another food bowl which has an interior decoration of conventionalized birds. It is a little larger than the first one.

A typical red water jar is shown in Plate 47, *C*, and Figure 30, left. This is decorated with birds, a stepped design that is said to have been intended for trees, and two broken lines. It is remarkable that the lines on all of the biscuit ware are unbroken, while on the red ware they are almost always broken. This piece is so like the jars found in the Frijoles Cañon that one could almost feel safe in saying that it came from there.

The other red water jar (fig. 30, right) is typical of the locality just south of the Frijoles, which is called the Frijolito ruin. It is a very large jar and the decoration is put on in a very good black glaze. (Pl. 47, *C*.) Three of the units have conventionalized birds in the panels. The meaning of the rest of the design is not known. These conventionalized birds have been extensively considered in the paper by Dr. Kidder and the reader is referred to it (fig. 31).[13]

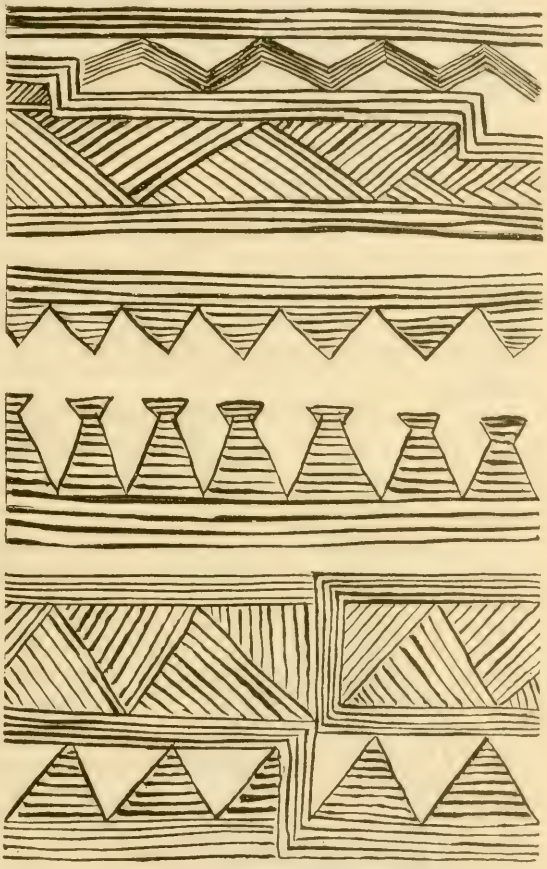


FIG. 26.—Incised designs.

DECORATIONS

AVAÑU HEADS

There is a great variety presented in the pattern commonly known as the Avañu head. Whether this name is a misnomer or not, the

[13] Pottery of the Pajarito plateau. Mem. Am. Anthrop. Assoc., vol. II, pt. 6, 1915.

author is not prepared to say. The Indians whom he consulted on the matter say that they are not sure that they know just what the figure means. Dr. Edgar L. Hewett calls it the head of the great plumed serpent.[14] (Fig. 32.)

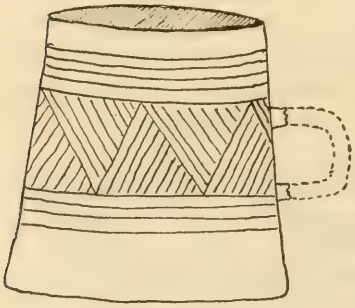


FIG. 27.—Incised mug.

My informants said that it might mean this, but they did not think so. Some of them were very decided in their interpretation of the sign as meaning the growing corn. This, they explained, was borne out by the dots, which represented the kernels of the corn, and the points on the tops, which represented the tassels on the top of the green ear. In a letter to the author from Mrs. Mary Austin, she says that the Sun Priest (her own words) at Taos told her that it was meant to represent the growing corn, and this was corroborated by Antonio Lujan, also a Taos Indian.

FIG. 28.—Red ware food bowl.

Mrs. Lucy L. W. Wilson suggests that it might be a "hand sign." She gives a number of reasons why she thinks so, but I can not agree with her.[15]

When questioned as to whether the sign might not mean a hand, my informants laughed and said, "No; what would they want to put a hand on a pottery vessel for." I called their attention to the fact that Dr. Fewkes had found food bowls in Arizona which were decorated with hands and that the people of the Jemez Plateau had marked their caves and cliffs with hand signs, but they persisted that the so-called Avañu was not a hand sign, and that they only felt satisfied that it was the growing corn. The same information was given at San Juan and at San Ildefonso as at Santa Clara.

FIG. 29.—Red ware food bowl.

We only encountered two cases where double heads were used (fig. 32, *A*, *B*), and these were both on sherds. On the one the heads

[14] Edgar L. Hewett. The Pajaritan Culture. Amer. Jour. of Arch., 2d ser., vol. XIII, no. 3, p. 341.
[15] Hand sign or Avañu. American Anthropologist, vol. 20, no. 3, pp. 311–313.

are pointing toward each other; on the other the heads are joined at the neck and point in opposite directions.

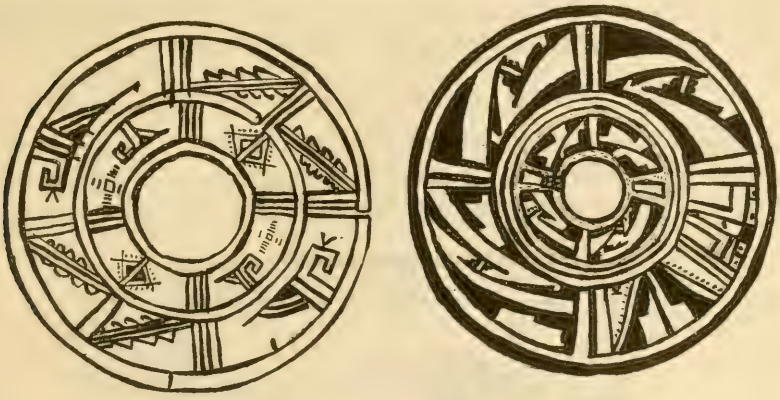


FIG. 30.—Red ware water jars.

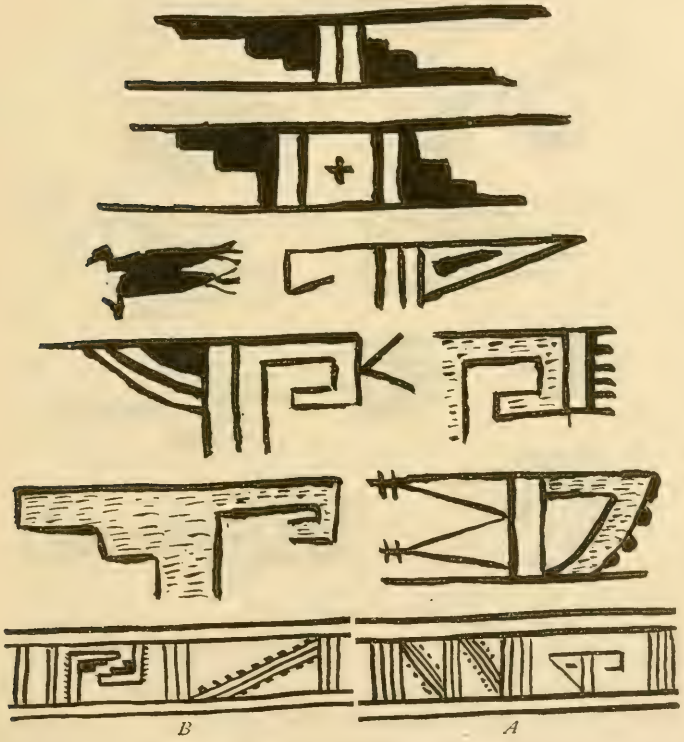


FIG. 31.—Birds, conventionalized forms.

BIRDS

The use of the bird as a decoration was very extensive all over the Jemez Plateau. In some cases the life form was used and in others, particularly on the red ware, the bird has been convention-

alized. It would be impossible to identify many of the pictures of the birds. Some of them are merely lines suggesting form, others are well-drawn birds, and still these are not exact enough to tell us what bird they are intended to represent. (Fig. 33.)

Miscellaneous Pottery Objects

Plate 49, *A*, shows a number of objects that have been made from potsherds. Those marked *A* are disks of pottery and may have been intended for two purposes, first, gaming counters, and second, un-

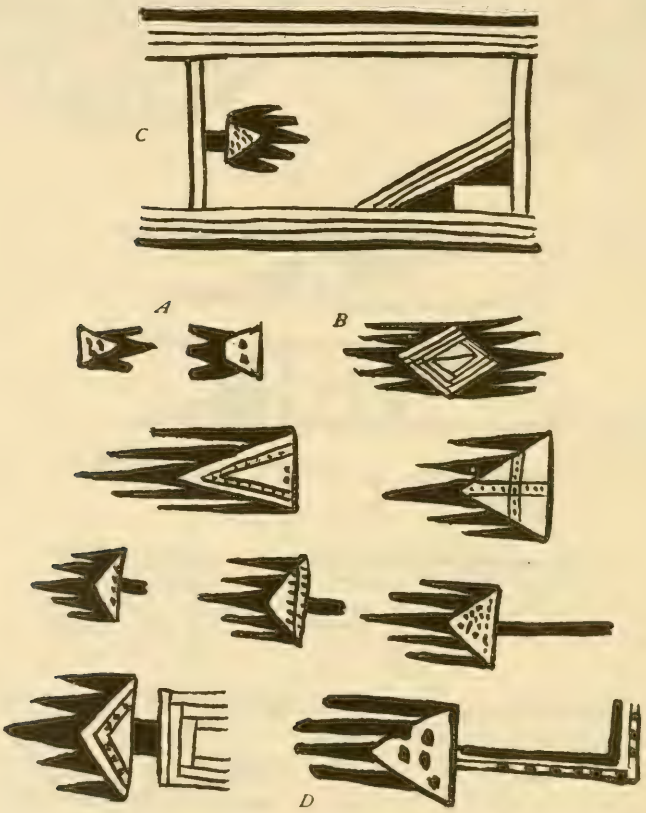


Fig. 32.—Avañu heads.

finished spindle whorls. It has been said that the people of the Jemez Plateau had no knowledge of the spindle whorl, but the author has found them at two different places on the plateau, namely, at Puye and at Pesede, on the Rio Oso. Some of those shown in the plate are perforated, and while they are rather small for spindle whorls, yet they might have been used for that purpose. There is also a possibility that the ones which have only the beginning of a perforation may have been used in the manufacture of beads. A

bit of pitch pressed in the hole would have made a good base to hold the material for making a bead during the drilling of it.

The objects marked *B* in the same plate were for shaping pottery. At present the women in the pueblos use similar things made of the rind of the calabash, and this gives us an index to the use of these pieces of pottery.

MOLDIES OR MOLDS

There are four excellent examples of what are known as moldies, or molds, for beginning the bottom of the larger pots. (Pl. 45, *C, E.*)

FIG. 33.—Birds, life forms.

The use of the mold to start the pot may have been a survival of the time when pottery was made in a basket. There were only a few pot bottoms at Po-shu which showed the use of a mold. Almost all of them were made without it.

POTTERY LIDS

These pottery lids were quite common in the ruin. What they were used for is not evident, as only one was found in connection with anything else. This was the small bowlder mortar which was found with the pottery lid on the top of it. (Pl. 50, *A*.)

POTTERY GORGETS

These objects should properly come under the heading of pendants, but have been inserted here for convenience. The two specimens shown on Plate 50, *B*, are sherds of pottery that have been shaped into gorgets. There are two holes for stringing them. The one is of biscuit ware and the other is of incised ware. Both are heavy and not particularly attractive. They may have been used as a mark of rank or insignia of some kind.

FIG. 34.—Bird on a mountain.

GAMING TALLIES

It is not unusual to find little squares and oblongs made of pottery. The supposition is that these were used as tallies in some of the games played. They may also have been used in a game similar to that of checkers which still is played by the Indians of the Southwest. (Pl. 49.)

LADLES OR DIPPERS

The use of properly shaped potsherds for dippers or ladles probably was just as common in the ancient days as it is to-day. The picture of the bird (fig. 34) on one of the ladles found is very interesting.

PRAYER PLUME BASES

The prayer plume bases shown on Plate 51 are made of clay and were ceremonial. The prayer feathers were tied around the top or inserted into holes in the top. The mixture of clay and some black pigment, possibly a ground-up slate and soot, is typical of this type of object found on the Jemez Plateau. In the case of Plate 51, *A*, a wash somewhat lighter than the whole mass was applied and portions of it remain. Plate 51, *B*, is most remarkable. It is shown upside down in the illustration and should have the point downward. In

the top is a small hole for inserting the prayer feather. The smaller end was put in the sand of the altar or shrine.

BISCUIT WARE SHERDS AND HANDLES

Plate 52 shows some unusual decorations on biscuit ware sherds. Plate 53 illustrates a variety of biscuit ware handles found in the ruin.

FETISHES

It is still the custom among the Pueblos to carry, in their fetish bags, small bits of copper ore, agate, and almost any kind of a small polished stone. The exact purpose of these is not known, but the general supposition is that they bring good luck to the one who carries them. Many of these polished stones were found in the ruin and a few are shown in Plate 54, *E*, *F*, *G*, *H*.

All through the ruin were found pieces of calcite crystals accompanying other articles which indicate their use as ceremonial objects. These crystals were in many cases beautifully stained with mineral matter, and from the coloring produced upon the primitive mind of the Indian a suggestion of being something more than ordinary stone. Very often pieces or sheets of selenite accompanied these crystals, and as in modern times things of this kind are still used on the altars of the Hopi and other Pueblo Indians, it is safe to assume that they were used in ceremonies and therefore were more or less precious. It has been suggested that some of the larger sheets of selenite were used as panes in the windows, but none of them was found in such position.

In room 16, location 10, were found a large number of reniform hematite concretions. (Pl. 55.) No remains of an altar or anything suggesting it were found where these concretions lay, but there is no question that they were fetishes and used as such. They have often been seen on Hopi and Zuñi altars. Their eccentric forms would naturally cause them to be looked upon as coming from some supernatural source. In color they are all of a brownish cast. The two shown on Plate 56, *A*, are highly polished and very beautiful in appearance. One informant from Santa Clara told the following about the polished ones: "This kind of stone is very good luck. Now I carry him in my pocketbook (*bolsa*) with my money 'cause he bring other money to me. In old time, men carry it in a buckskin bag with other things for make *pujocante* (magic). When they go to fight they put it in the mouth and it make him brave; and when a man he is going to run long way, he keep it in his mouth and it make him strong. This kind of stone is very good magic."[16] The informant

[16] Statement by —— Tafoya. Given name unknown.

showed me the concretion he carried, and it was the same sort of a thing as was found in the ruin.

Two beautiful specimens of fluorite, stained a delicate purple, were used as bases for prayer plumes. (Pl. 56, *B*.) They have holes at the top for the placing of the "breath feathers" and have been smoothed or ground down to a very good polish on the sides. One of the handsomest bits of mineral in the collection is a selenite crystal (pl. 56, *D*) which is stained a beautiful soft green. This was also a fetish of some kind and may have been carried in a fetish bag.

It is unusual to find well-made fetishes of animals and birds on the Jemez Plateau. The two specimens (pl. 56, *E*, *F*) were found together in a room with some other ceremonial things. *E* was intended to represent a bird and is made of pottery. *F* is a piece of stone which shows that some work has been done on it and probably represented an animal, possibly a bear. The bear fetish is the most popular animal fetish in use to-day on the Rio Grande. The bit of selenite crystal (pl. 56, *G*) has been carried so long that the facets are partly worn away and the two ends nicely smoothed.

A piece of pottery with saw-tooth edges and with the beginning of a drilled hole on one side of it is strongly suggestive of the fetish now used by the Navajo and called by them "Spider woman." The saw-tooth edge of this piece of pottery would not be practical for sawing and the teeth are not long enough to permit of its being used as a comb. (Pl. 56, *H*.)

Ceremonial paint sticks are very rare and the specimen shown (pl. 56, *I*) is an unusually fine specimen. The material is a burnt senna mixed with some sort of grease to hold it together. It is nicely polished and shaped.

Two of the most interesting fetishes found in the ruin are made of black earth and grease. The winter cacique at Santa Clara said that they were used in some of the ceremonies of the Koshare and that there ought to be four in the set. He said that the material of which they are made is the same as that of the "maposhune" (meaning unknown) or black ceremonial paint which is used by the male dancers. These fetishes have holes in the top for the placing of the prayer feathers. From what I could gather they are very sacred and caused much talk when they were shown to a few men in Santa Clara. (Pl. 56, *J*.)

Gypsum is used to a large extent in the making of fetishes, even to-day, and several nondescript pieces of this material were found in the ruin. What they were originally intended for it is impossible to say now, but that they were once carved into some form is still apparent. One of these is shown in Plate 56, *K*.

By far the most interesting fetish found is the one marked *L*, Plate 56. This is a maternity fetish and as such it was used by the wife

of one of my workmen while we were in camp, during childbirth. The exact use to which it was put was not told me, but the woman declared that she wore it in her belt over the abdomen and that it helped her wonderfully. The figurine is 62 mm. high, 24 mm. at the broadest part, and 27 mm. from the back to the end of the abdomen. The material is a typical biscuit-ware paste, but it has not been very well baked. Running the full length of the back is a groove 17 mm. wide, 45 mm. long, and 5 mm. deep. Special medicines were mixed and placed in the groove; the figurine was then tipped up and the medicine allowed to run into the mouth. Fetishes similar in appearance to this one have been found in Porto Rico and are elaborately described and discussed by Dr. J. W. Fewkes in the Twenty-fifth Annual Report of the Bureau of American Ethnology. From the information at hand it would seem that this is the first figurine of its kind that has been found in the United States.

That curious natural formations were frequently used as fetishes is too well known to need any comment, and on Plate 55 are shown a number of these found at Po-shu. Some still show traces of paint. That selenite objects were also used ceremonially is indicated by the finding of the objects shown on Plate 57. *A* is the blade of a knife made of selenite, which could have no practical use, as the cutting edge has not the strength or sharpness to cut anything. *B*, same plate, has a cross on two sides of it. The crosses may have been intended for stars. *C*, same plate, could easily be interpreted as a sun symbol. The base of this specimen has been rubbed flat so as to set level, and the radiating crystals might have suggested the rays of the rising sun. Many other handsome mineral specimens were found and were probably used as fetishes or on the altars during ceremonies. (Pl. 58.)

Koshare Fetish

This is a very curious object made of lava. At first it appeared to be a smoothing stone of some kind, but the horns show no sign of use such as would appear if they had been grasped in smoothing. The bottom shows a very little polish, and after showing it to several men who are versed in the ancient ceremonial objects they all said that it was a sign or symbol of the fraternity known as the Koshare. In all of the dances where the Koshare appear they wear tufts of corn husk on the head arranged as horns. Sometimes the head man of the fraternity actually wears two horns, one on either side of the head. The stone object found is said by my informants to represent these horns. It was found in a room in company with many other ceremonial objects, and therefore the statement of the informants seems correct. (Pl. 59, *A*.)

FIRESTONES

White quartz pebbles of large size are still used in the rain ceremonies of the upper Rio Grande pueblos. Many of these stones are found in all of the ruins, and Po-shu was no exception to this. Some of them are beautifully shaped. (Pl. 59, *B*.) The use to which they are put is as follows: At one time during the rain ceremonies the drum is beaten to represent the thunder and the white quartz pieces are rubbed together. This rubbing produces an incandescent glow which resembles lightning. This information was given me by several men of Santa Clara and of San Ildefonso. It was also corroborated by Mr. J. P. Harrington.

MISCELLANEOUS OBJECTS

That the use of turquoise for inlaying was known to the people of Po-shu is evidenced by the finding of bits of that stone prepared and polished for the purpose of inlaying. Some of the bits are shown in Plate 54, *A*. A small fragment of bone which was used for backing the inlay was also found, but has since been lost. The bit of sandstone (pl. 54, *H*) may have been for a like purpose. Some of the bits of turquoise show that much work has been done on them; they are nicely polished and in places beveled. Whether the bit of chalcedony (pl. 54, *D*) was also used in inlay work can not be stated, but its beautiful finish and form suggest some such use.

Two beads of turquoise (pl. 54, *B*) were all that were recovered. I heard many stories of large numbers of turquoise and shell beads having been found in the ruin, but, like many other stories in connection with the ruin, was not able to find anyone who had actually seen them or knew who the person was who was supposed to have taken them out. Only one shell bead was recovered. (Pl. 54, *C*.)

That several kinds of marine shells were used as beads and pendants is shown by the finding of one Nassa and four Olivella shells. These had been drilled for stringing. They are described under the head of shells. (Pl. 54, *I*, *J*.)

There were very few wooden objects found in the ruin, some kicking or gaming pieces (pl. 60, *A*) and one arrow (miniature) making up the list. The gaming balls are shown on Plate 60, and do not present anything out of the ordinary. The little arrow (pl. 61, *A*) is most curious and was probably used in connection with some ceremonial, as it is not practical for ordinary use.

The finding of portions of wild turkey eggs is one of the most unusual features of the excavations. These were found at the southwestern corner of plaza No. 2 at a depth of over 1 m. When first uncovered one of the eggs was almost entire. Only a small part of one end was gone and the yolk could be plainly seen inside of the

shell. In a short time the yolk fell to dust and the shell also crumbled somewhat. In many places in the excavation we found bits of pottery with portions of eggshells still adhering to them, and often where there were no shell remains there was a decided yellow stain from the yolk. (Pl. 61, *B*.)

In room 11, location 3, was found a little bunch of human hair. There was no skin attached to it and it is impossible to say whether this is part of a scalp or only a lock of hair. There were no other objects accompanying it. (Pl. 61, *C*.)

About 10 pumpkin, gourd, and other seeds were found. These were in a very soft condition and only a few were saved. (Pl. 61, *F*.)

A twisted buckskin thong was found in room 8, location 3. This is the only piece of hide of any kind that was found. It appears to have been wrapped around some object, but what that was we do not know, as it was just as it appears at present when found. (Pl. 61, *G*.)

BASKETRY

From indications found in the ruin, basketry was fairly plentiful in the village. There are several basket impressions on the adobe and a few fragments of baskets. In location 2 was found the remains of a basket which had been subjected to fire and was badly charred. A quantity of this was recovered and a fragment is shown in Plate 61, *D*. This is in such condition that the weave can be plainly seen. It is of the two-rod-and-bundle weave. The following description from Dr. Kidder's report on explorations in Arizona will give a good idea of the manner of making the basket. "The rods, varying in thickness according to the fineness of the product, are thin, round twigs with pithy centers; the bundles consist of fibers, usually from the yucca leaf, more rarely of what appears to be some sort of shredded root; the sewing elements are thin wooden splints. . . . The two rods are set side by side and the fibrous bundle is laid above them. The sewing element, in inclosing this foundation, takes in the rods and the bundle above them, and also passes through about half of the bundle of the coil below. It is this gripping of the bundle of the lower coil which alone holds the fabric together."[17]

It is most remarkable that the same weave should be found in such widely separated places.

That the basket found in the charred condition is not an isolated case is shown by the finding of impressions on the adobe in several other parts of the ruin. Impressions of another type were found that belong to the twilled work. Mason's description of the weave is as follows: "Twill or tweel. A diagonal appearance given to a fabric

[17] Kidder and Guernsey, Archeological Explorations in northeastern Arizona, Bull. 65, Bur. Amer. Ethn., p. 168.

by causing the weft threads to pass over one warp thread and then under two, and so on, instead of taking the warp threads in regular succession, one down, one up. The next weft thread takes a set oblique to the former, throwing up one of the two deposed by the preceding. In some twills it is one in three, or one in four." [18]

In the case of the twilled baskets of Po-shu the weave was one under and three over. A curious thing in connection with one set of basket impressions is that one side of the clay shows a negative of the weave and the other side shows a positive. (Pl. 62.) Whether the basket rotted away from between the two pieces, or whether it rotted away before the top part was made we do not know, but both sides of the basket are seen and the two prints fit within each other exactly. The general appearance of the weave is that of a basket that is still made at Zuñi, N. Mex., and said to be of very old origin. It also resembles the so-called diagonal weave that is found in the old Hopi and Zuñi mantas. The fabric from which the baskets were made at Po-shu was probably yucca. A small part of one of these baskets was found, but it is very difficult to determine the material. (Pl. 61, *E*.)

PICTOGRAPHS

Only two pictographs were found during the excavation. The hills and the river bottoms in the vicinity were carefully searched, but yielded no results.

On a rock 150 m. from the southwest corner of plaza No. 1 are two pictographs. One (pl. 63, *A*) is a turkey cock. This is 25 cm. in height. Accompanying it is the picture of a snake which is 50 cm. in length. (Pl. 63, *B*.) On the top of the rock are rubbing places or cupping stones, and on the side of the rock below the tail of the bird are more cups. Just what the function of these cups was is not known. In a former exploration on the Rio Oso the author saw many stones with the cups pounded or rubbed in them. Upon asking the Indians as to their meaning, it was claimed that no one knew what they were for. Finally one man was found who said that at certain times of the year, and during certain ceremonies, it was and still is the custom for the women to go at daybreak and pound on the rocks to attract the attention of the "Sun god." The same rocks were always used, and that accounted for the holes. The informant's name was Aniceto Swaso. The information is given here and the reader may draw his own conclusions. I do not venture to say that it is or is not correct.

SHRINES

In making a reconnaissance of the surrounding country near the ruin we found many shrines and stone works that were at first rather mystifying. Leading from the ruin in many directions were paths

[18] Otis T. Mason, Aborignal American Basketry. Rept. Nat. Mus. for 1902, pp. 224–225, 1904.

formed by double rows of stones; these extended in almost every direction and always ended at what appears to be a shrine of some kind. It is hardly safe to say every time one comes across a group of stones arranged in a square or circle that it is a shrine. There were thousands of such arrangements in the country around the ruin. In fact, it looked as though the whole neighborhood was a mass of shrines, but by carefully following out the paths which led to them we at last established what are beyond doubt the world shrine and the four cardinal point shrines. Unfortunately, photographs of all of the shrines were not obtained and a thorough study of the subject was left for some future time. There can be no mistaking that the places which we saw and designated as the world and cardinal point shrines were what we have called them. Enough is known of the shrines of the present-day Pueblos to be able to say something about the shrines of Po-shu. Closely related to the world shrine are three tanks for holding water, and some interesting data were secured with reference to these. At a point about three-fourths of a mile southeast from the ruin on the second mesa south is located what we have called the middle or world shrine. (Fig. 35.) This is a large circle of stones about 40 feet in diameter and with an opening passage to the east. The opening is 10° off from the magnetic north. (This observation was taken August 4.) There is no doubt that the circle at one time was much higher than it is at present. There are evidences that there may even have been a low adobe wall over the top of the stones. We made several excavations inside of the circle and found no floor or remains of walls. There were no ceremonial objects any place that we could see. Surrounding the large circle were eight minor shrines. Five of these were circles, two were squares, and one was a triangle. These were all well defined, and placed on and between the cardinal points. (Fig. 35.) Leading from the east doorway was a path of double rows of stones about 60 cm. apart. There are three tanks on the tongue of a low mesa 228 m. northeast of the

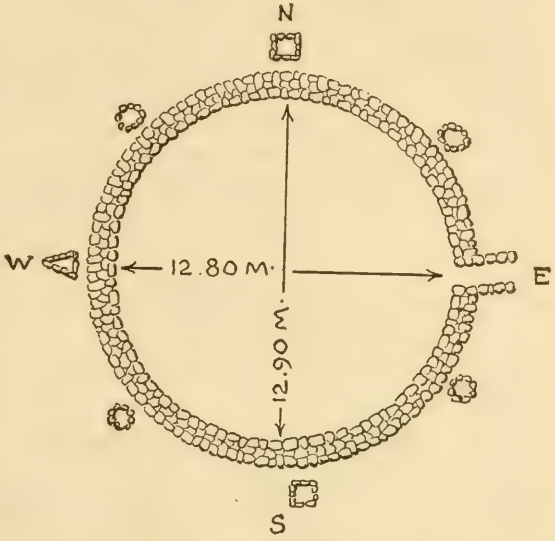


FIG. 35.—Diagram of the World Shrine.

doorway. All about these tanks were most interesting designs of stones laid on the ground. Triangles with the base line omitted pointed toward the village, and there were many squares, circles, triangles, and other figures. Leading in a direct line from the northwest corner of the tanks was a path with the same kind of a double row of stones, and we afterwards followed this down to the pueblo.

With regard to the world shrine and the tanks the following information was given by Aniceto Swaso, a Santa Clara Indian. (This is not given literally, as it had to be translated from the Spanish.) "When the people of Po-shu lived in the village and there came a long dry spell, the summer and winter caciques, with some other men (Koshare?), would go to the world shrine and pray for rain. They would stay there for four days and nights and make magic to bring the rain. Only a very few men knew the rain medicine, and they had to fast all the time that they were praying and making magic. Then on the fifth day, before the sun came up, they would go down the path between the stones and all the time they kept on making magic until they reached the tanks. There they would stop, and when the sun just began to come up the rain would come down in a gentle shower and fill up the tanks. It did not rain any place else than at the tanks. Even the edge of the ground around the tanks did not get wet; the water only fell directly into the tanks. A runner was then sent to the village and told the people to bring with them the small ceremonial vessels for carrying the sacred water and to come to the tanks. When they arrived there the water was dipped out with the ceremonial cups. (Pl. 43, *A*, *A*, *C*.) No human hand must touch the water, and then the people carried the water back to the village, where parts of it were drunk and other portions reserved for extra strong medicine. Then in a very short time it rained all over the country and the drought was broken. In going and coming from the shrines and tanks and from the village the people must keep between the rows of stones which made the sacred paths. In case none of the doughnut-shaped cups were at hand, an abalone (?) shell was used to dip out the water to the people. If the prayers for rain failed, the ceremony was repeated, and always after the fourth attempt rain fell. This never failed."

The informant further said that this same ceremony is still performed in times of extreme drought and that only a very few men now know how to do it.

Less than half a mile on the mesa south of the ruin is the west shrine. (Pl. 64, *C*.) About a mile and a half to the east is the east shrine, and across the river, on the north side of the Chama River, is the north shrine. (Pl. 64, *B*.) The south shrine is difficult to find, and it was a long time before we found it. It is located on the top of a very high point, about a mile south of the world shrine, and

is very difficult to reach. The same type of double rows of stones lead to all of the shrines, and though in many places the stones have been washed away, yet by careful search the trail can be found and followed. The whole country south and east of the ruin is covered with stones, marking out designs and figures. We did not have time to make any sketches of these, but I hope sometime to have an opportunity to study all of the shrines and the attendant stone works.

BURIALS

Burial No. 1.—The remains of a very young child. This was found at about 1 m. below the surface of the ground, in room 2, location 1. It was buried in a natal position. Owing to the soft condition of the bones we were unable to get a photograph of them in situ. The head

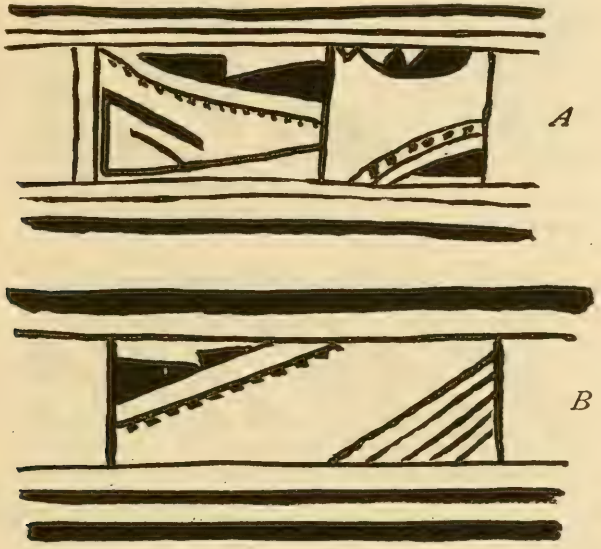


FIG. 36.—Exterior and interior decoration on bowl accompanying burial No. 1.

was pointing to the southwest. The burial occurred in the southwest corner of the room. (Fig. 36.)

Burial No. 2.—These were also the remains of a young child. The burial was about 30 cm. below the surface. Fragments of a large biscuit-ware bowl accompanied this burial. As in the preceding case, the burial was made in the natal position. (Fig. 37.)

Burial No. 3.—The remains were those of an adult and were found in room 6, location 1, about 45 cm. below the surface. The knees were bent at almost right angles to the body, which was lying with the head to the northwest. Immediately in front of, and lying partly on top of the pelvis and under the right arm, were the remains of a large biscuit-ware tub. Just above the pelvis and under the hand

bones lay a flaked quartzite chip. The bones of the right forearm were joined at the elbow, but were about 9 cm. apart at the wrist. The body (pl. 65) was twisted and had the appearance of lying on its stomach and face, with the right cheek down. There were remains of a cloth over the face, from the forehead down to the chin on the right side. The cloth was in such bad condition that no idea of the material of which it was made could be obtained. Accompanying the burial were a paint stone and red paint, portions of a broken biscuit-ware bowl (fig. 38), chipped quartzite, and a small fragment of red ware under the skull.

Burial No. 4.—The remains of an adult taken out at a point immediately outside of the corner of the plaza wall, in front of room 15, location 3. The outside wall at this place forms an angle with a short

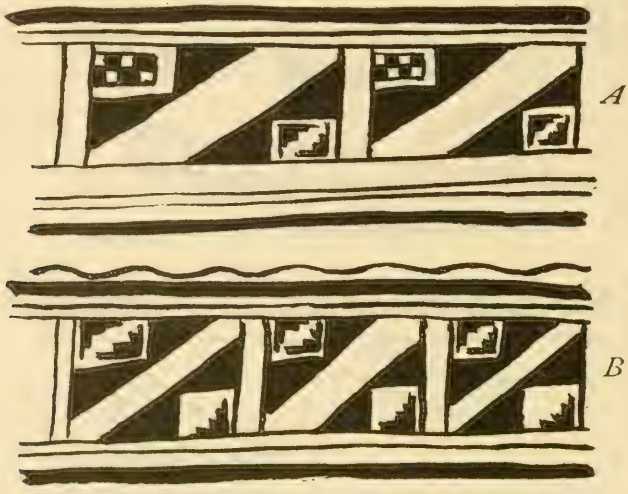


FIG. 37.—Exterior and interior decoration on bowl accompanying burial No. 2.

piece of wall which extends outward toward the plaza. In this angle the burial was made. The head lay to the southeast, face down, with the body resting on the face, elbows, and knees. The left shoulder blade was resting on the back of the head; the left hand on the left breast. No objects of any kind accompanied this burial. With reference to other burials taken out the following is quoted from the report of Dr. Yarrow:

After carefully examining the remains of the village, we set out in search of the graves, and found that bodies had been buried within 30 feet of the walls of the town. The arroyos, as already stated, had been washed out by water, and the falling away of the earth disclosed the remains. The first skeleton found was in the right-hand or eastern arroyo, some 6 or 8 feet below the level of the mesa, and had been placed in the grave face downward, the head pointing to the south. As the body lay we had a fine section of the strata of the earth above it. Two feet above the skeleton we noticed two smooth black "ollas," or vases, which, when dug out, were found to

contain charcoal, parched corn, and the bones of small mammals and fowls which had, doubtless, been placed therein at the funeral feast; and the remaining earth to the surface contained nothing but pieces of charcoal. Not a vestige of clothing, no ornaments, implements, or weapons were found near the corpse, and apparently no receptacle had been employed to contain it. By carefully digging away the surrounding earth with our knives, we were fortunate enough to secure every bone belonging to this skeleton, and it has arrived in Washington in good order, and is now in the Army Medical Museum.

A further search in both arroyos revealed more bodies similarly buried, and we secured several skeletons, but in some cases the crania were wanting. Three or four skeletons of children were also discovered, but the bones were in such fragile condition as to crumble on exposure to the air, consequently we were unable to preserve them.[18]

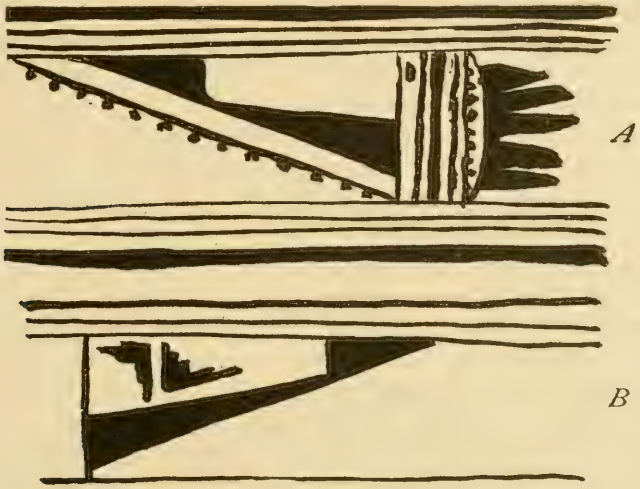


FIG. 38.—Exterior and interior decoration on bowl accompanying burial No. 3.

SUMMARY

From all indications found in the excavation, Po-shu was a pre-Spanish village. As has been stated heretofore, there was absolutely nothing of a Spanish nature found in the ruin.

From traditional evidence the people who originally inhabited the village came from some country north of them. The following tradition obtained at Santa Clara and San Juan is of interest as bearing on the first settling of the whole Chama region:

Long time ago all the people live in the Sipapu or lake under the ground. Then one time they come out on the earth. After while it got very cold, lots of snow and ice and the people had to go away. They began to go south. All of them did not go at the same time, but lots went together [in great waves]. We were a long time coming down to this country; sometimes we stop long time in one place, but all the time it was still too cold for us to stay, so we come on. After while some people get to what you call Mesa Verde, in Colorado. [The Tewa have place names for many of the localities around Mesa Verde. This information was corroborated by J. P. Harrington.]

[18] H. C. Yarrow, Notice of a ruined pueblo and an ancient burial place in the valley of the Rio Chama. Rept. U. S. Geog Surv. w. of 100th meridian, vol. VII, Archæology, p. 364, Washington, 1879

Then they began to get restless again and some go west on the San Juan River, some of them come down and cross over in two places, from the north, some of these come by way of the Jicarilla Apache country, some come the other way by way of Cañon Largo, Gallinas, and the Chama. Maybe so some of them come down the east side of the Rio Grande. Any how, we all get here finally. Po-shu was a place where they hold big fairs, lots people come there to trade and have fiesta, that's why you find all different kinds of pottery there. Some people afterwards move down and live in old Santa Clara, or Kah-Po. [The San Juan people also claim that the people of Po-shu came to their village.] We don't know why all the people left Po-shu, but we think that they were driven out.

The above statement was made by Aniceto Swaso, of Santa Clara. It is rather doubtful that the inhabitants of Po-shu moved directly to the Rio Grande, as there are several villages between these points that the same people claim as ancestral homes of their forefathers. It is rather more probable that they moved from one group to the other for reasons that we do not know.

As has been stated before, Po-shu shows evidences of having been deserted very suddenly. The people were farmers, as is shown by the seeds of squash, pumpkin, and gourd that were found. Charred corn was also found in a few of the rooms, but not in any great quantity. Meat was also used as food, and possibly the seeds of many of the native plants that were not cultivated. They were excellent workers in stone and bone. The artifacts show a great variety in these two materials. The pottery is as good as any found on the Jemez Plateau, and of greater variety than has ever been found before in one place. The finding of all the different types on one level is possibly accounted for by what the Indians say, that the village was a place where great fairs were held. That there was some outside influence on the pottery is very evident. This, of course, does not necessarily mean that the new ideas were obtained from any great distance, but may have been brought in by captives or visitors. From tradition it appears that it was the custom to kill the men of the enemies and take their children and women as captives, and in many cases these captives were assimilated into the tribe to whom they were captive. This would in a measure account for suggestions of types that were foreign to Po-shu, even though the paste is a local one. These influences are not as found in the villages farther east, and it is the writer's opinion that Po-shu marks one of the steps in connecting the Rio Grande country with the country farther west, possibly even the San Juan drainage. Of course, it is too early to more than suggest that such a connection exists, but with the traditional evidence at hand and a careful survey of the country west of the Chama some such result may be obtained. We are constantly hearing stories of ruins which lie in a line to the west and the southwest, and it is highly important that a full reconnaissance of this country be made.

INDEX

Page.

ABALONE SHELLS, appreciation of.... 34
ABIQUIU, ruins in vicinity of.... 1
ABIQUIU MOUNTAIN, location of.... 2
ADOBE—
basket impressions in.... 69
bowlders laid in.... 9
plate of, for making bread.... 10
walls made of.... 11
walls of, washed away.... 6
AGATE—
used for arrowheads.... 19
used for axes.... 18
AGRICULTURE—
ditch as evidence of.... 2
seed as evidence of.... 69,76
ANDIRONS, conical stones used as.... 24
ANTIQUITY, indications of, not borne out.... 39
ANTLERS, remains of.... 30
ARROW, of wood.... 68
ARROWHEADS, variety of.... 19
ARROWSHAFT STRAIGHTENERS, materials for making.... 23
ARTIFACTS—
bone.... 24–31
stone.... 17–24
AUSTIN, MRS. MARY, information supplied by 60
AVAÑU HEADS—
a pottery decoration.... 52,53,59–60,62
double.... 60–61
AWLS, bone, use of.... 28
AXES, stone.... 17–18
AZTEC RUIN, pipe found near.... 31
BALL GAMES, stones used in.... 21
BALL, STONE, found with ring.... 24
BANDELIER, ADOLPH—
ruin described by.... 3–4
unique pottery found by.... 47,57
BASKET, curious impression of.... 70
BASKETRY, method of manufacture.... 69–70
BEADS—
bone.... 26
marine shells used for.... 68
of turquoise.... 68
BEAR FETISH, in use to-day.... 66
BELTS, bones used in weaving.... 31
BIRDS as pottery decoration.... 52,59,61–62,63,64
BISCUIT WARE—
characteristic of decoration on.... 38
chronology of.... 37,40,41
decoration of.... 41,42,43,44,45–47
early types of.... 42
explanation of name.... 40–41
forerunners of.... 38
late types of.... 44–47
middle types of.... 42–44

Page.

BLACK-AND-WHITE WARE, late.... 38,39
BLACK MOUNTAIN, location of.... 2
BONE, artifacts of.... 24–31
BOWLDERS, wall of.... 9
BOWLS, of biscuit ware.... 44–46,47–51
BOX, incised cylindrical pottery.... 57
BRADFIELD, WESLEY G.—
acknowledgment to.... 5
assistance of.... 4
theory of.... 12
BREAD—
baked on adobe plate.... 10
"tissue-paper," made in the pueblos.... 10,24
BREASTPLATE, of bone.... 26
BUCKSKIN THONG, found in ruin.... 69
BUILDINGS, height of.... 5
BURIALS.... 73–75
CALCITE, mortars made of.... 23
CALCITE CRYSTALS, found in ruin.... 65
CAPTIVES, treatment of.... 76
CARDINAL POINT SHRINES.... 71,72
CARDINAL POINTS represented on mortars.... 23,43
CARROLL, MITCHELL, acknowledgment to.... 4
CENTIPEDES as pottery decoration.... 44,47,50
CEREMONY for breaking drought.... 72
CERRO DE LOS BURROS, name of mountain.... 2
CHAMA RIVER, ruins on.... 1
CHAPMAN, KENNETH—
acknowledgment to.... 5
visit of, to ruin.... 4
CHECKERS, game similar to.... 64
CHIMNEYS, no evidence of.... 15
CLAY, for pottery making.... 36,37
CLOUD BLOWER.... 32
CLOUD SYMBOL.... 45
COILED WARE—
black, paste for making.... 36
hard.... 39
only kind found.... 37
CONCRETIONS, bowl-shaped.... 22
CONICAL STONES, used as andirons.... 24
COOKING POTS, shapes of.... 54
COOKING WARE, black, chronology of.... 40
COPPER ORE, field of.... 2
CORDOVA FAMILY—
acknowledgment to.... 5
ruin on land of.... 2
CORN, GROWING, sign of.... 60
See AVAÑU HEADS.
COUP-POINTS, reference to.... 19
COVERS, STONE, for storage jars.... 24
CRAZING ON POTTERY.... 44,45
CULIN, STEWART, spheroids described by.... 21
CUPS IN ROCK.... 70
CUTTING EDGES, crude types of.... 18

Page.

Débris, stratification of 6
Decoration of pottery, examples of 42, 44, 45, 48–64
Dimensions of ruin 7–10
Dirks of bone 26
Disk-shaped stones, possible use of 21
Disks, pottery, possibly gaming counters 62
Doorsill of stone 14
Doorways 13–14
Dragon flies, as decoration on pottery 43, 45, 50
Duck-shaped vessels 39
Eldot, Sam, unique pottery owned by 47, 57
Escalante, Fray Silvestre Velez de, ruin noticed by 4
Fetishes—
  finding of 2
  objects used as 65–67
Fewkes, J. Walter—
  acknowledgment to 4
  decorations on pottery found by 60
  fetishes described by 67
  pottery found by 38, 60
  quoted on pipes 31, 32
  spheroids described by 21
Fire, used for drying walls 11
Firedogs, conical stones used as 24
Fireplaces, description of 15
Fish, as decoration 50
Flag design, on pottery 42, 43, 49, 50
Flakers, use of 25
Floors—
  composition of 14
  manner of polishing 21
  openings in 15
  paving of, with stone 15
Fluorite, specimens of 66
Flutes, bone, collection of 27–28
Food bowls 47–51
Foundations of stone 10
Frijoles Cañon, red ware abundant in 58, 59
Frijolito ruin, pottery typical of 59
Games, stones used in 21
Gaming balls, wooden 68
Gorgets, pottery 64
Gypsum, fetishes made of 66
Hair, human, found in ruin 69
Hand sign, theories concerning 60
Handles of biscuit ware 65
Harrington, J. P.—
  acknowledgment to 5
  information furnished by 20, 68, 75
  translation by 1
Headdress, deer-horn 30
Hematite—
  ax of 18
  ball of 24
  concretions as fetishes 65
  rarely used 18
Hewett, Edgar L.—
  acknowledgment to 4, 5
  quoted on Avañu heads 60
Hoes, specimens possibly used as 18
Holmes, W. H., acknowledgment to 4
Hopi Indians—
  methods of, in building walls 11
  use of spheroids by 20

Page.

Hopi pottery, resemblances to, of Po-shu specimens 37, 51, 53
Hough, Walter, mention of discovery made by 32
Implements—
  chipped 17–19
  flaked and finished 19–23
  of uncertain use 29–31
Incised design, symbolism of 56
Incised ware 54–57
Inlaying, turquoise used for 68
Irrigation, evidence of 2
Javelin points, reason for name 19
Jeancon, Don L., assistant in expedition 4
Jeancon, J. A., in charge of expedition 4
Jemez Plateau—
  use of stone on 14
  water jars found on 53
Judd, Neil M., spheroids found by 21
Kayenta ware, mention of 45
Kidder, A. V.—
  description by, of basket weaving 69
  quoted on biscuit ware 40
  reference to 45, 48, 59
Kitchen or cooking room 9–10
Kiva, only one in ruin 16
Knife blades, bone 29
Knives, flaked stone 19
Koshare fetishes 66, 67
Ladles, potsherds used as 64
Lids of pottery 64
Linton, Ralph, pottery found by 38
Mallery, Otto T., acknowledgment to 4
Manos, many found 22
Maposhune, a black ceremonial paint 66
Mason, O. T., description by, of basket weave 69
Maternity Fetish 66
Maul heads 18
Meal bins—
  found in kitchen 10
  in floors 16
Meal, sacred, scattered in ceremonies 29
Mesa Verde, use of stone at 14
Metates—
  few found 21
  in grinding room 10
Mica, presence of, in pottery 36, 40
Mimbres ware, suggestion of 48
Moccasin-shaped vessels 39
Molds for pottery 63
Moorehead, Warren K., reference to 19
Morris, Earl—
  elbow pipe found by 31
  pottery named by 38
  quoted on shell beads 34
Mortars—
  accompanied by spheroids 22
  calcite 23
  forms of 22
Mortuary customs 73–75
Mountain symbol 45
Mugs found in San Juan drainage 57
Names. *See* Tewa place names.
Navaho Indians—
  design named by 51
  fetish of 66

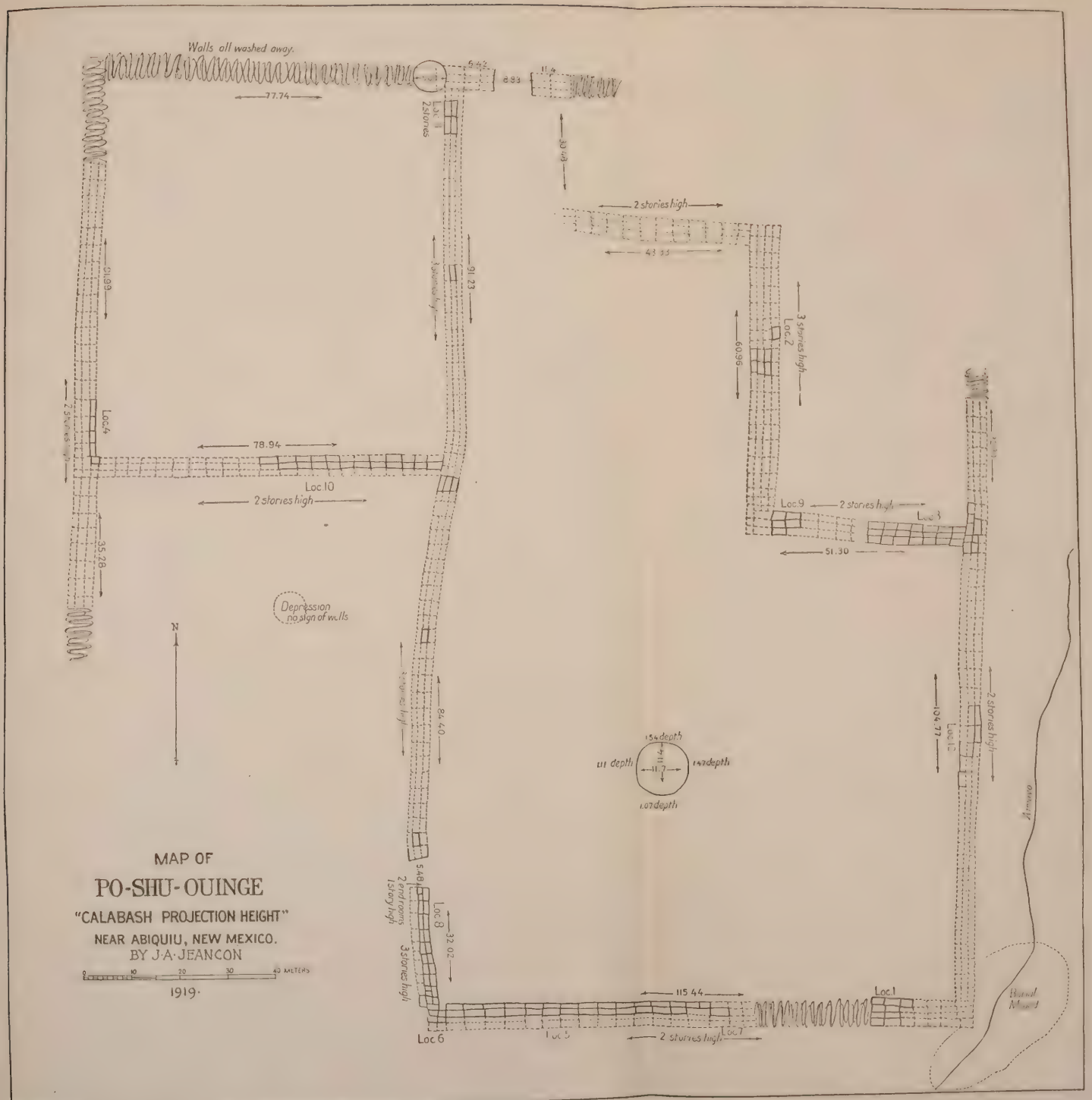
	Page.
Necklaces, bones used for	30
Needles, bone, use of	28
Obsidian, used for arrowheads	19
Openings in walls	13
Orientation of ruin	7–8
Origin tradition	75
Osborn, Henry F., reference to	19
Paint, black, made from slate	24
Paint stick, fine specimen of	66
Painting on walls	12
Paragonah, Utah, excavations at	21
Paste for pottery making	36
Paving—	
stone used for	24
with slabs	15
Pectunculus, worn as a pendant	34
Pendants—	
necklace, bones used as	30
of painted stone	33
of pottery	33
of selenite	33
of shell	34
unpierced	33
See Gorgets.	
Pesede, spindle whorls found at	62
Pestles found in ruin	22
Pictographs found during excavation	70
Pinched ware, only piece of	39
Pins, bone, use of	28
Pipes—	
ceremonial	32
decorations on	32
new form of	31
with lateral wings	32
Pits in floors	15
Place names. *See* Tewa place names.	
Plaster—	
painted	12
white, on walls of kiva	17
Plate, adobe, for baking bread	10
Plazas—	
described	5
measurements of	7
Plugs for openings in walls	13
Plumed serpent, head of, as decoration	60
Pointed stones, use of	19
Polishing stones, use of, in pottery making	21
Po-shu-ouinge—	
abandoned in haste	3
buildings composing	5
expedition to	4
location of	1, 2
meaning of name	1
See Ruin.	
Potsherds, used for grinding tools	24
Pottery—	
abandoned at ruin	3
chronology of	37
decoration of	41–64
distribution of, in rooms	35
for ceremonial use	36
found in storage room	8
implements for shaping	63
influences affecting	40
method of polishing	21
quality of	76
technique of making	37
Pottery—Continued.	
types of, found at Po-shu	34–35
varieties of	37
Prayer plume bases	64–65, 66
Pre-Pueblo ware	38
Problematical object, explanation of	36–37
Pueblo Bonito, pipes from	31
Puye—	
red ware abundant in	58
spindle whorls found at	62
Quartz—	
used for arrowheads	19
used for axes	18
Rain, praying for	72
Rain ceremonies, stones used in	68
Red ware	58–59
colored with yellow ochre	36
Retaining wall, use of	12
Ring of stone, a natural formation	24
Rio Puerco culture suggested by specimens	47
Roofs, construction of	16
Rooms—	
dimensions of	8–10
grinding	10
kitchen	9–10
round	8–9
storage	8
weaving	10
Ruin—	
indication of age of	8, 39
orientation of	7–8
See Po-shu-ouinge.	
San Juan drainage, pottery of	57
San Juan Indians, claim of ruin by	3
Sandstone, use of—	
for andirons	24
for arrowshaft straighteners	23
for mortars	22
Santa Clara Indians—	
claim of ruin by	3
theory advanced by	12
work of	4
Saws, serrated flakes used as	19
Scrapers—	
flakes used as	19
for tanning hides	25–26
Seeds found in ruin	69, 76
Selenite—	
pendants made of	33
possible use of	65
Shells—	
appreciation of	34
barter in	33
beads of	68
used as bells	34
Shrines—	
as places of prayer	72
large number of	71
Slate—	
specimen made of	26
used for pigment	24
Slip—	
gray	46, 47
on biscuit ware	41
red, method of obtaining	36
Snakes as decoration on pottery	43, 45, 50

	Page.
SPATULAS, possible use of	29
SPEARHEADS, ceremonial	20
SPHEROIDS—	
diversity of	20
found with mortars	22
SPIDER WOMAN DECORATION	50, 51
SPINDLE WHORLS, of pottery	62
SPRING HOUSE, MESA VERDE, illustration from	16
STONE—	
artifacts of, workmanship shown in	17
slab of, for closing door	24
use of, for floors	15
used as paving	24
STORAGE ROOM	8
STRATIFICATION OF DÉBRIS	6
SUN GOD, ceremony connected with	70
SWASO, ANICETO, foreman on expedition	4
information furnished by	20, 70, 72, 76
SYMBOLISM OF INCISED DESIGN	56
TALLIES for gaming	64
TEWA PLACE NAMES—	
P'op'ing	3
Po-shu-ouinge	1
T'umayo	2
TOBACCO, use of	31
TRADITIONS—	
of pilgrimage to "sky-blue water"	33
of settling of Po-shu	76
TUBES, BONE, possible use of	26
TUBS, BISCUIT WARE, decoration on	49–53
T'UMAYO—	
materials obtained from	2
Tewa name of mountain	2
TURKEY CALLS, made of bone	27
TURKEY EGGS, found in ruin	68–69
TURQUOISE—	
beads of	3
used for inlaying	68
TURQUOISE VILLAGE, ruin known as	1
TURTLE, as decoration	48
VENTS in walls	13
WALLS—	
double	13
method of erecting	11, 12
openings in	13
plastered	12, 13
WALTER, PAUL A. F., acknowledgment to	4
WASH—	
floors coated with	14
on walls, number of coats	12
WATER JARS	53–54
miniature	38–39
shapes of	54
WATER SUPPLY OF PO-SHU-OUINGE	2
WEAVING, bones used in	31
WEAVING ROOM, described	10
WILSON, MRS. LUCY L. W., quoted on "hand sign"	60
WOMEN, activities of	10, 11, 21
WOODEN OBJECTS found in ruin	68
WORLD SHRINE	71
YARROW, H. C.—	
quoted on burials	74–75
ruin visited by	3
YELLOW OCHRE, used in red ware	36
YUCCA, baskets probably made of	70

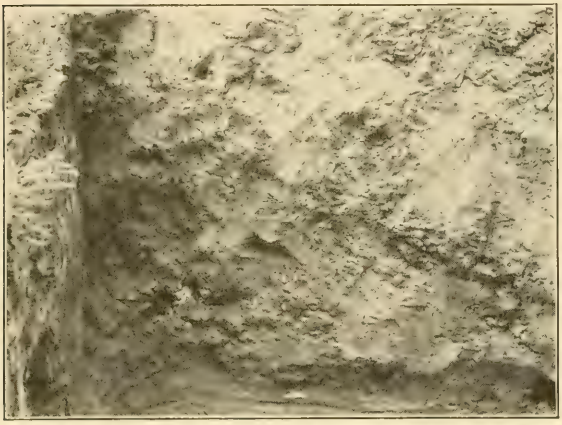
P(

"CALA

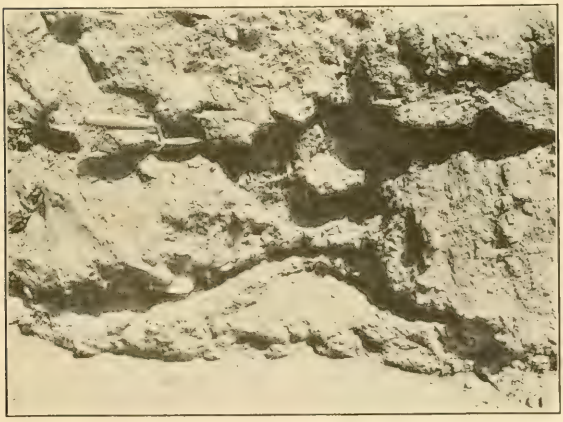
NEA


Walls all washed away.
77.74
Loc 11
2 stories
6.83
11.4
39.93
2 stories high
43.35
3 stories high
Loc 2
60.96
91.23
3 stories high
21.89
2 stories high
Loc 4
78.94
Loc 10
2 stories high
35.28
Depression
no sign of walls
N
Loc 9
2 stories high
Loc 3
51.30
2 stories high
104.77
Loc 12
84.40
154 depth
111 depth
147 depth
107 depth
5.48
2 end rooms
1 story high
3 stories high
Loc 8
32.02
115.44
Loc 1
Loc 6
Loc 5
2 stories high
Loc 7
Burial Mound
MAP OF
PO-SHU-OUINGE
"CALABASH PROJECTION HEIGHT"
NEAR ABIQUIU, NEW MEXICO.
BY J.A. JEANCON
0 10 20 30 40 METERS
1919.

A. North side of Chama Valley.



B. Cross section of débris in a room.



C. Cross section showing floor level.

Photographs by Wesley Bradfield.

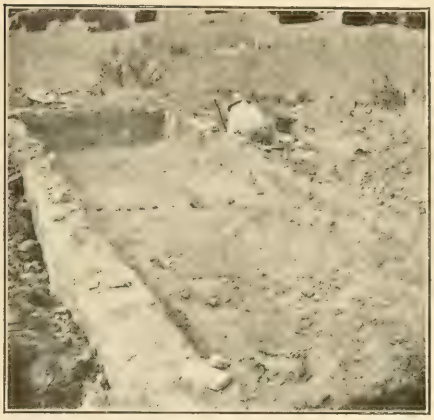
A. Series of rooms in location 3.
Photograph by Wesley Bradfield.

B. Location 10.

C. Location 5.

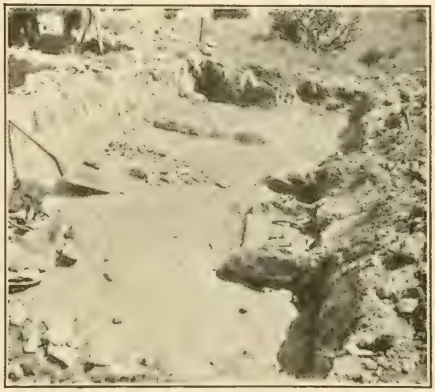
EXCAVATED ROOMS.

A. Mound of round room.

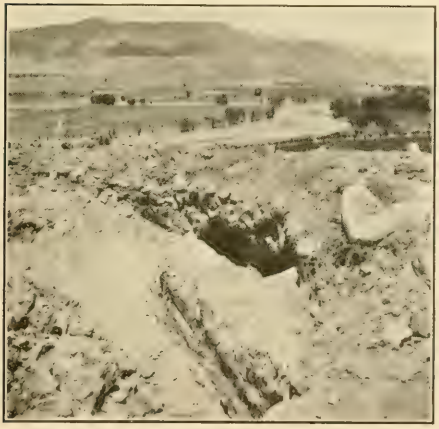


D. Weaving room.

B. Walls and double floor, round room.



E. Kitchen.



C. Lower cobblestone outer walls, round room.

F. Kitchen.

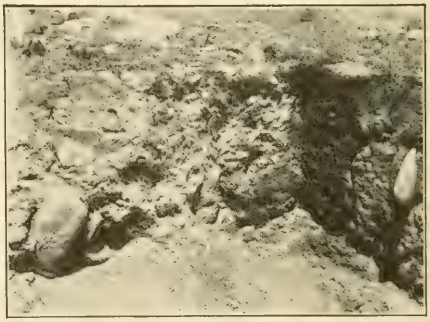
A. Washed-out wall locations.

D. Wall on top of foundation.

B. Foundation stones.

E. Cobblestone plugs.

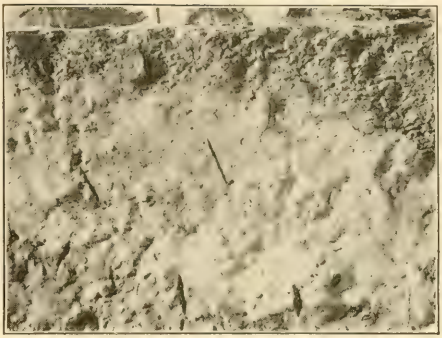
C. Foundation stones.



F. Cobblestone foundations.

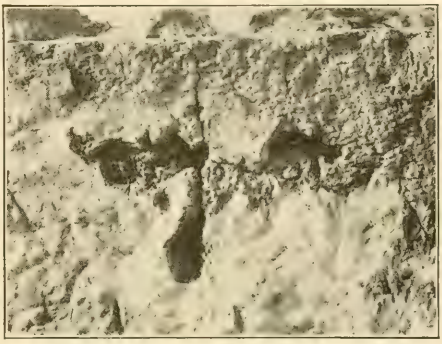
Photographs by Wesley Bradfield.

A. Wall construction, showing nodules.

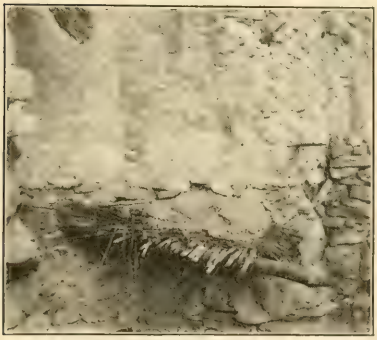


D. Plaster on wall.

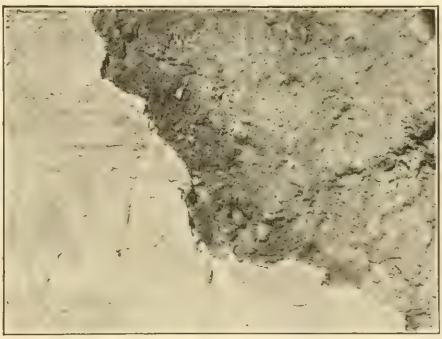
B. A group of nodules.



E. Plaster partly removed, showing rectangular checking.

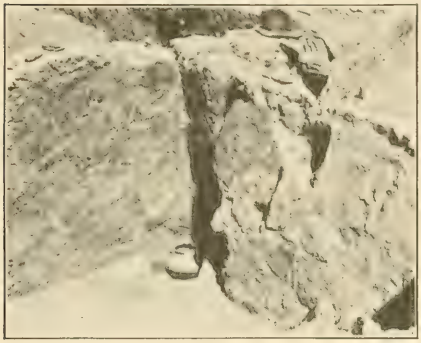


C. Roof fragment from Spring House, Mesa Verde National Park.



F. Broken plaster.

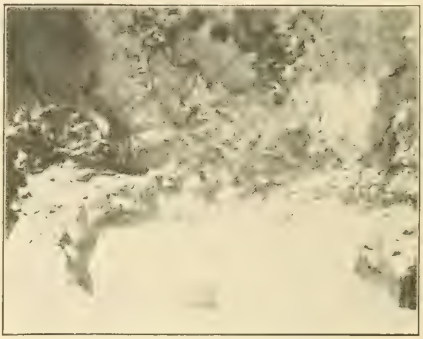
Photographs by Wesley Bradfield.



A. Adobe brace for weak wall.

D. Double wall.

B. Corner of room. Adobe plug on the floor.

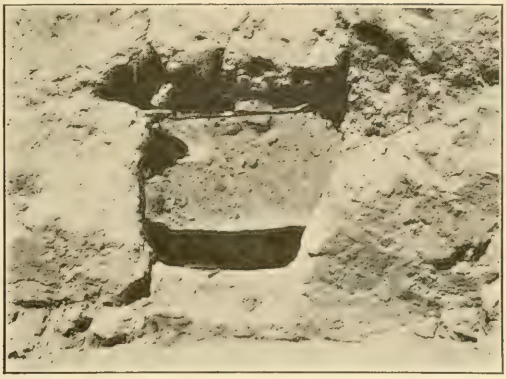


E. Fireplace.

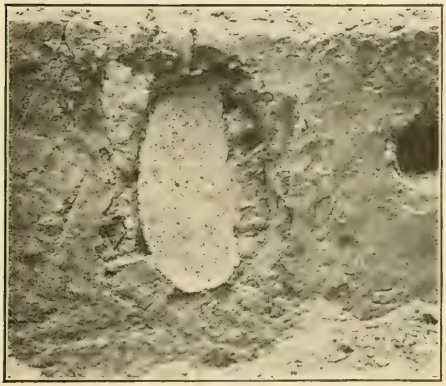
C. Paving, doorway, and air vent.

F. Fireplace.

Photographs by Wesley Bradfield.



A. Doorway with remains of stick lintel.



B. Metate sealing doorway.

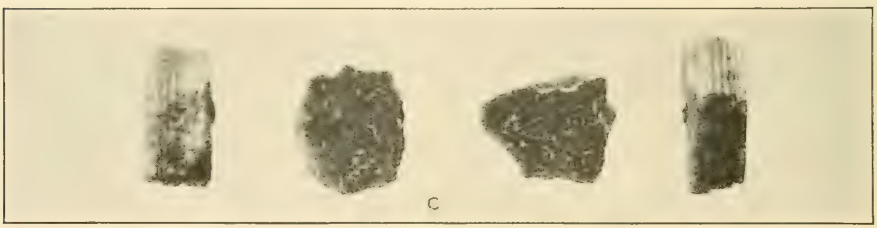
D. Meal bin.

C. Oval-topped doorway.

E. Meal bin.

Photographs by Wesley Bradfield.

Adobe flooring.

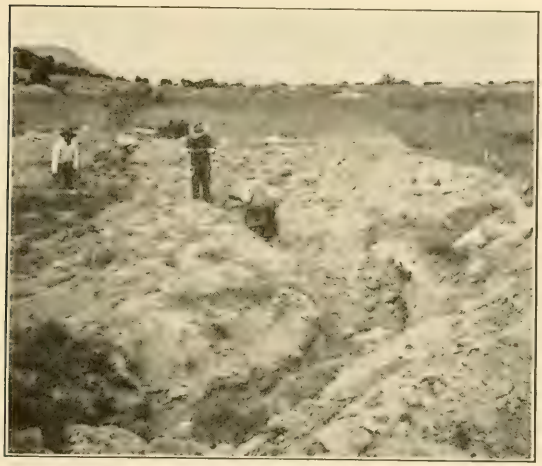


Plaster from the walls.

Stick markings in adobe floor.

Photographs by Wesley Bradfield.

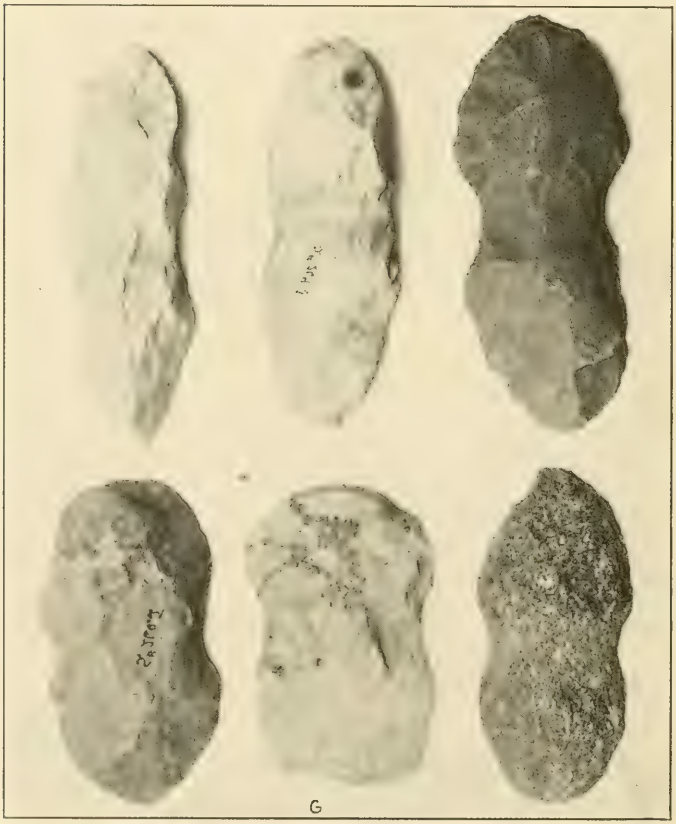
A. Unexcavated kiva site.



B. Excavating the kiva.

C. Kiva wall.

MAULS.



TZII-WI OR WAR-AX HEADS.

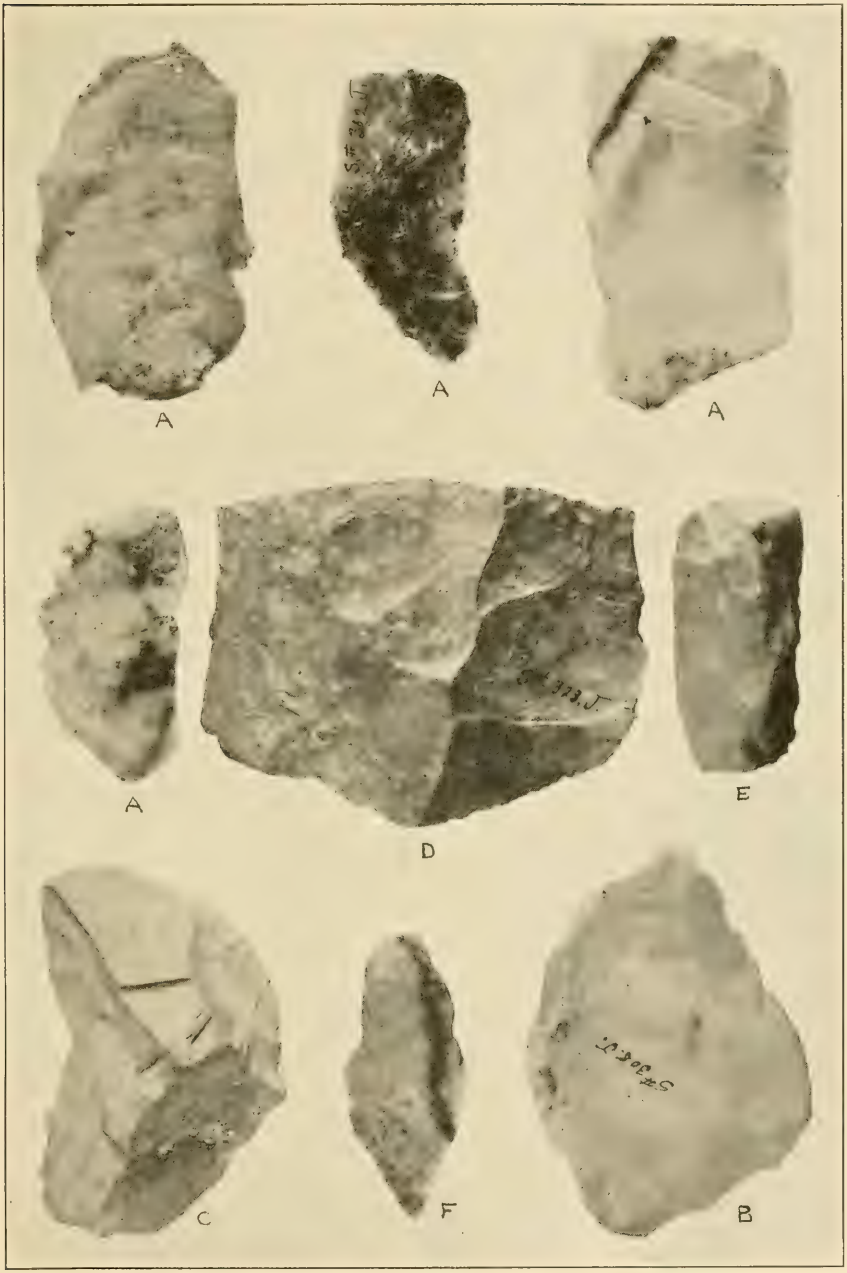
POLISHED AX HEADS

b. *a.* *b.* *b.*

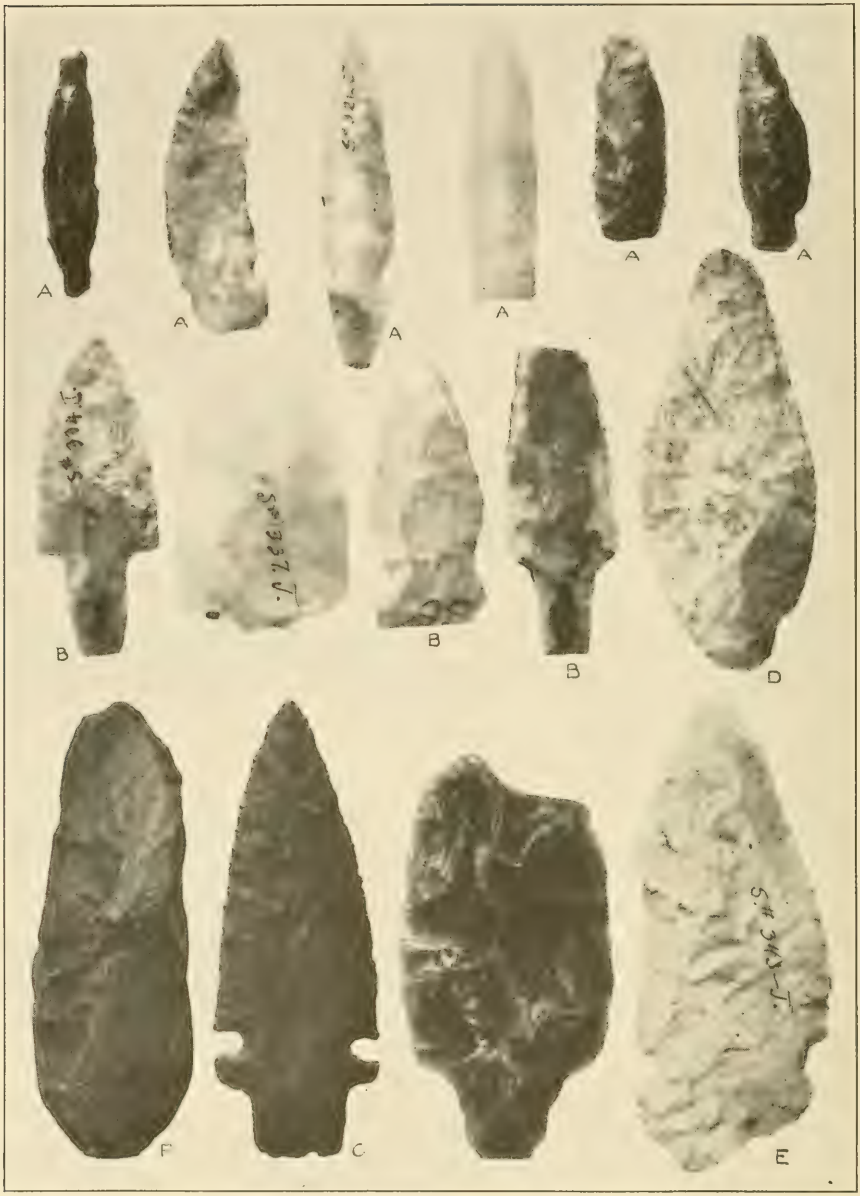
a. *b.* *b.* *b.*

A. Crude implements. *a*, Hoes (?); *b*, picks (?).

B. Crude ax heads.

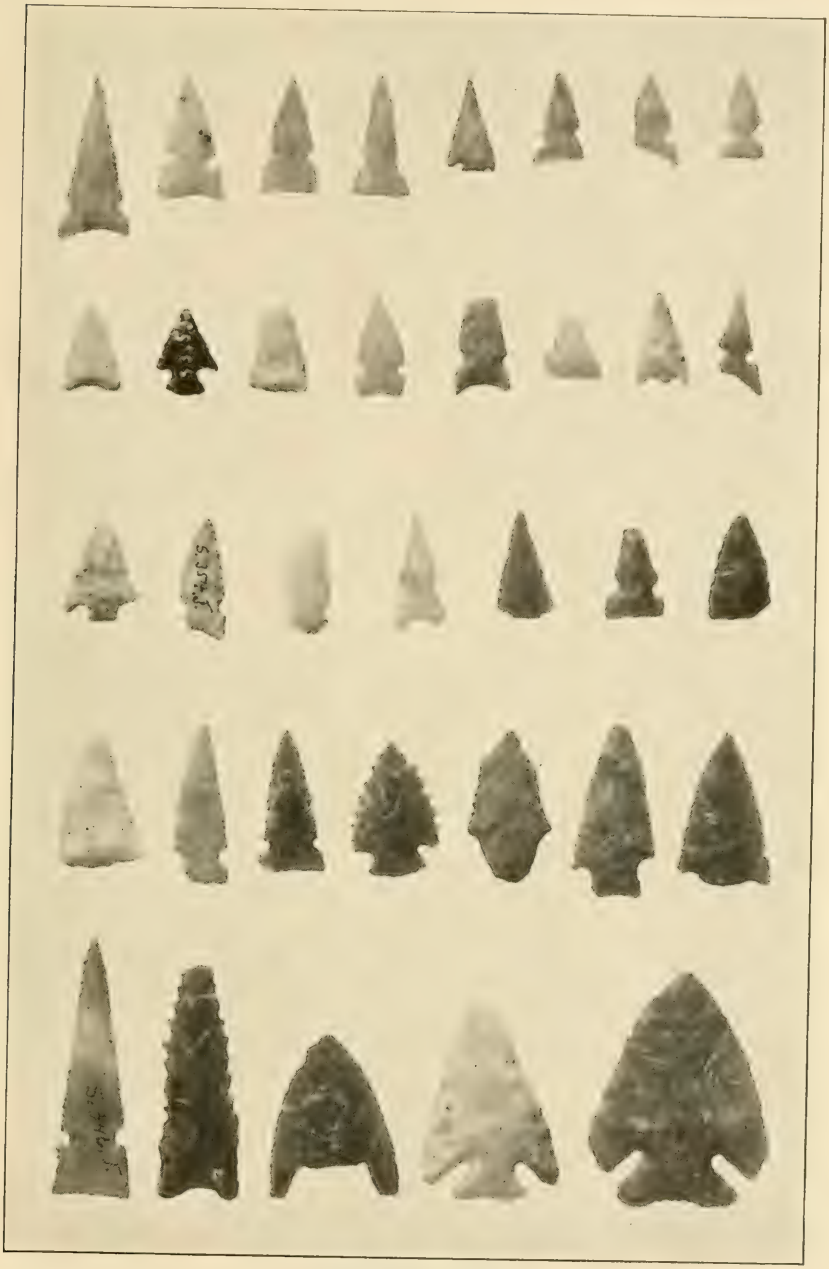


CRUDE FLAKED IMPLEMENTS AND CUTTING EDGES.



FINE FLAKED IMPLEMENTS.

A. Knife blades.
B. Javelin points.
C. Ceremonial spearhead.
D. Leaf shaped.
E. Spearhead or knife.
F. Slate implement.



ARROWHEADS.

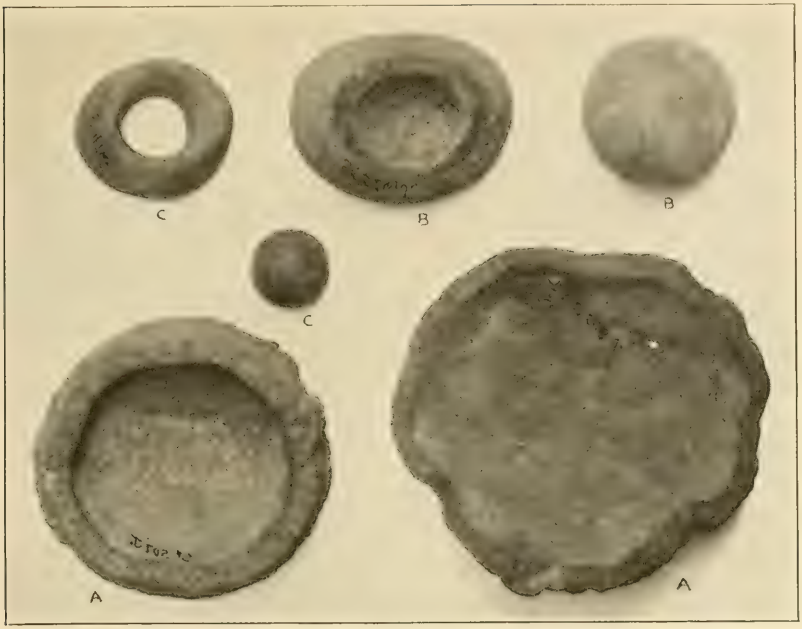
STONE IMPLEMENTS.

A, C. Spheroids. *B.* Floor polishers. *D.* Quartz disk. *F.* Pottery polishers.

A. Manos. *B*. Polishing stone for floors.

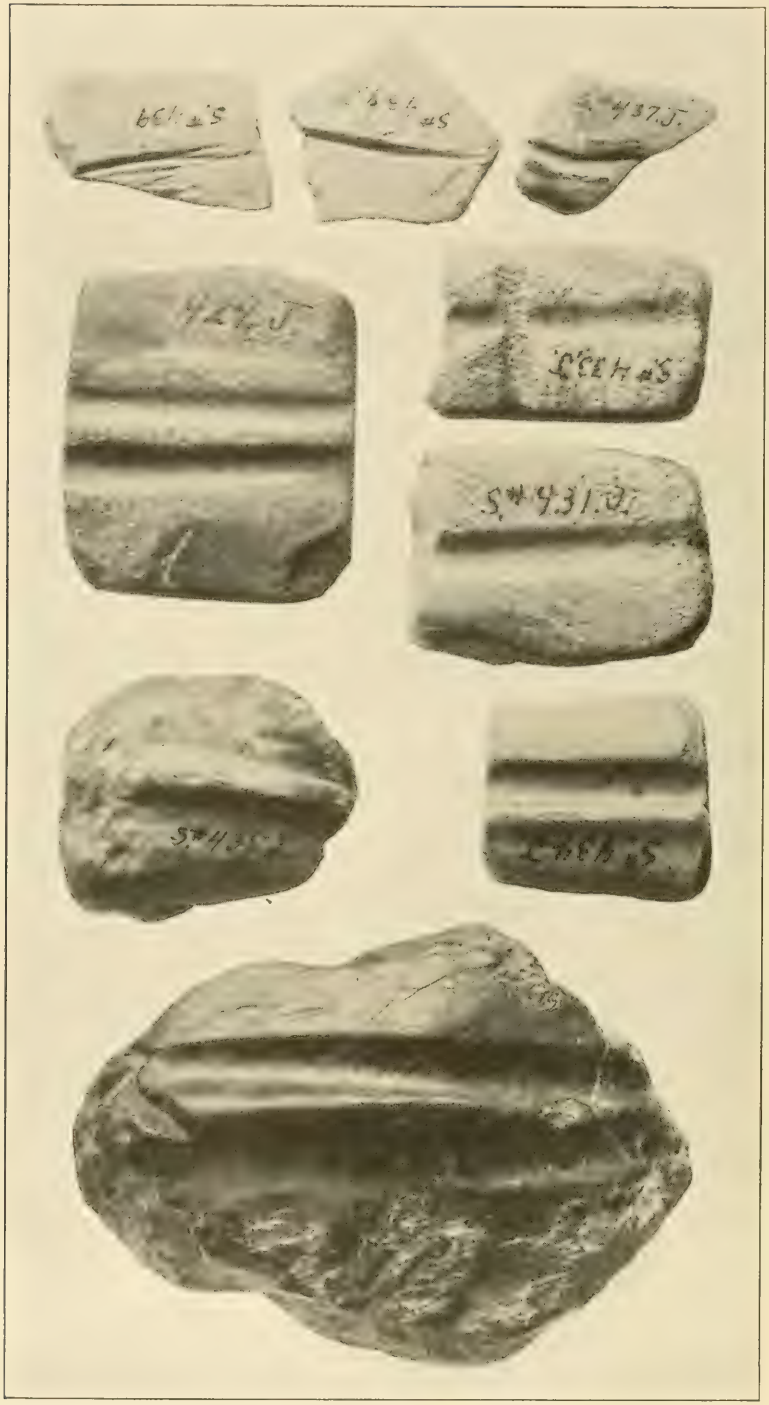
MORTARS.

A, B, C. Sandstone mortars. *D, E.* Lava mortars. *F–M.* Selenite mortars.



A. Bowl-shaped concretions. *B*. River bowlder mortar with pottery lid. *C*. Ring and ball concretions.

D. Stone andirons.

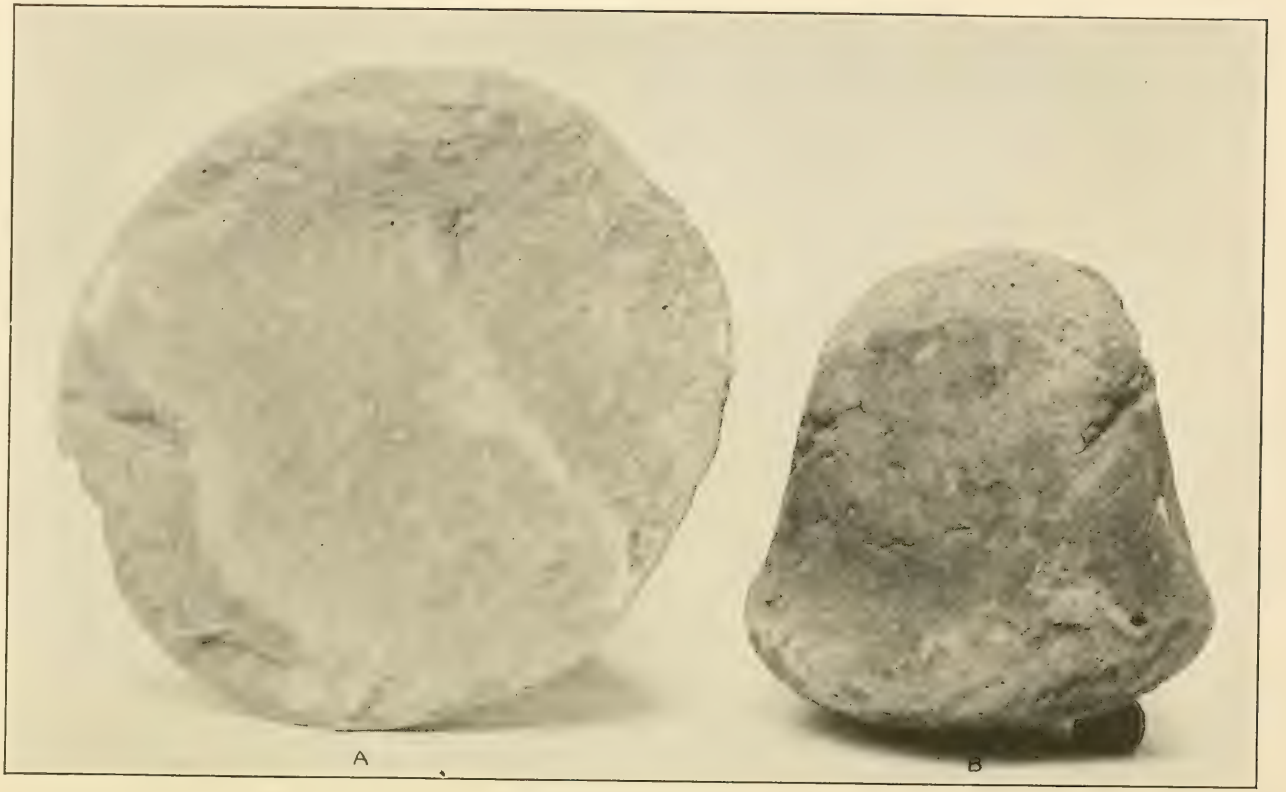


ARROW-SHAFT POLISHERS.

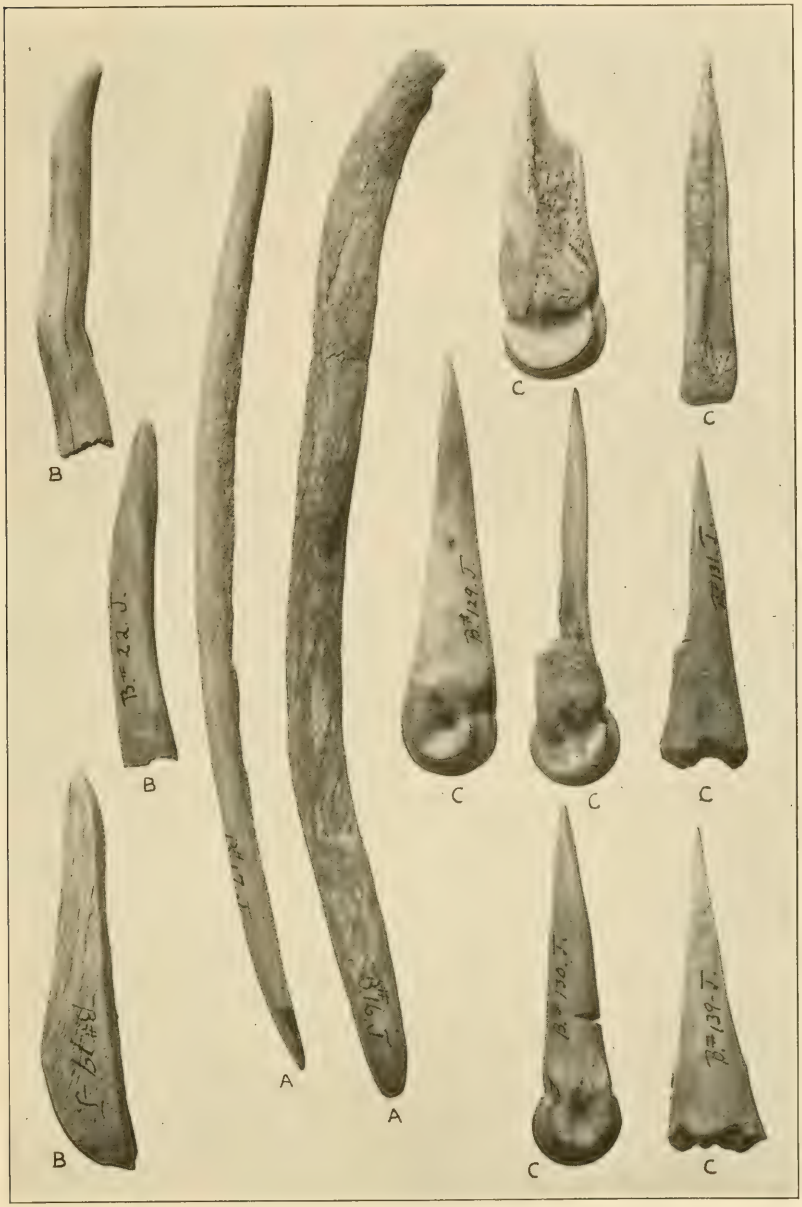
Those in the upper row are of pottery and were used to sharpen bone implements.

A

MISCELLANEOUS STONE OBJECTS.



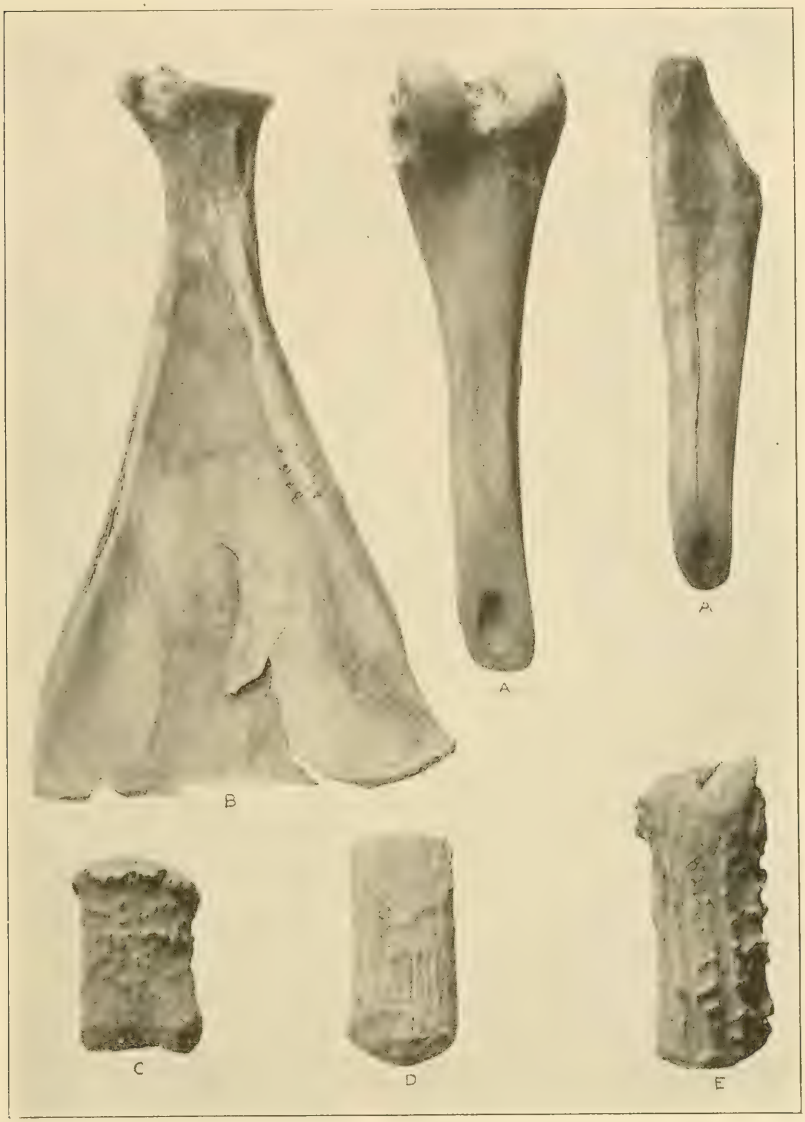
A. Stone pot lid. *B*. Adobe plug.



BONE IMPLEMENTS.

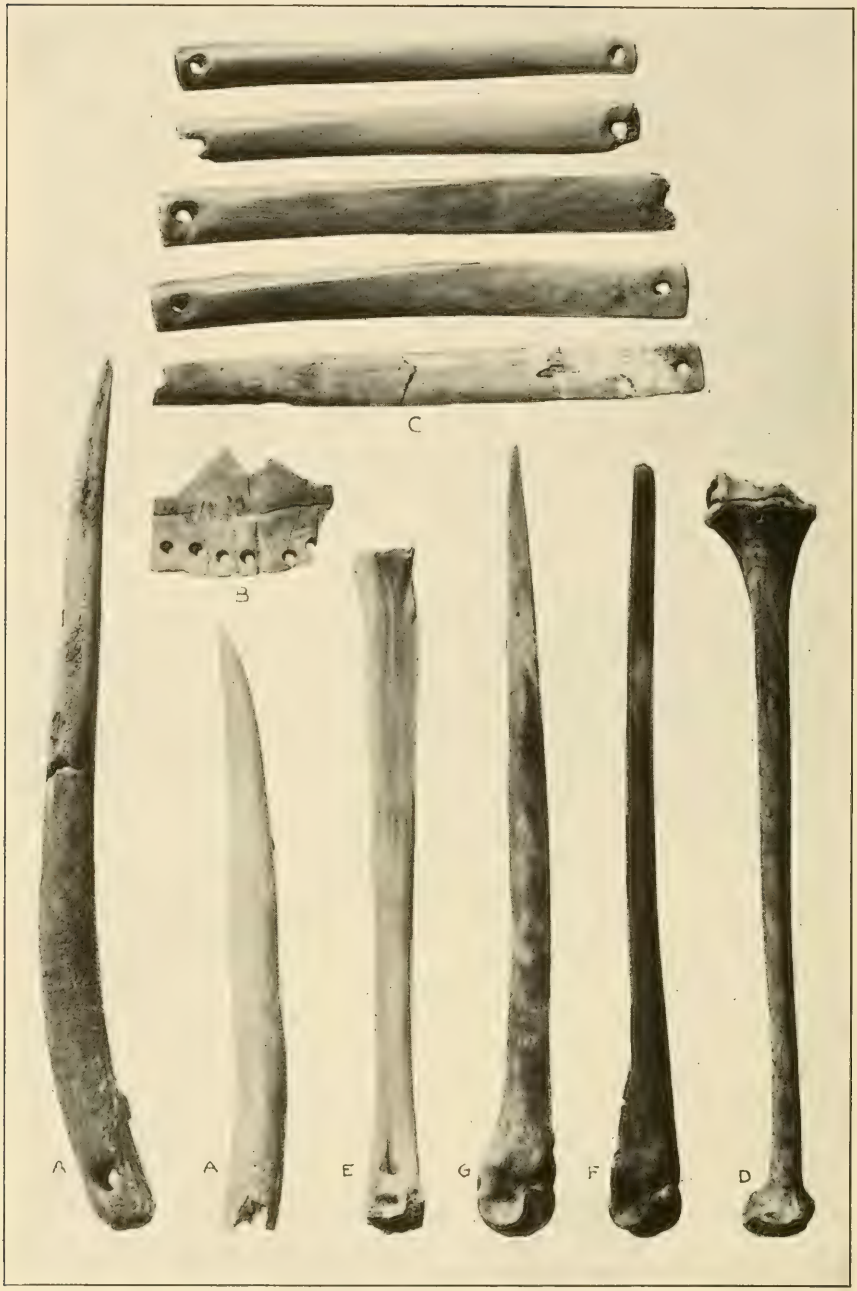
A, B. Bone flakers. *C.* Heavy bone awls.

TANNING TOOLS.

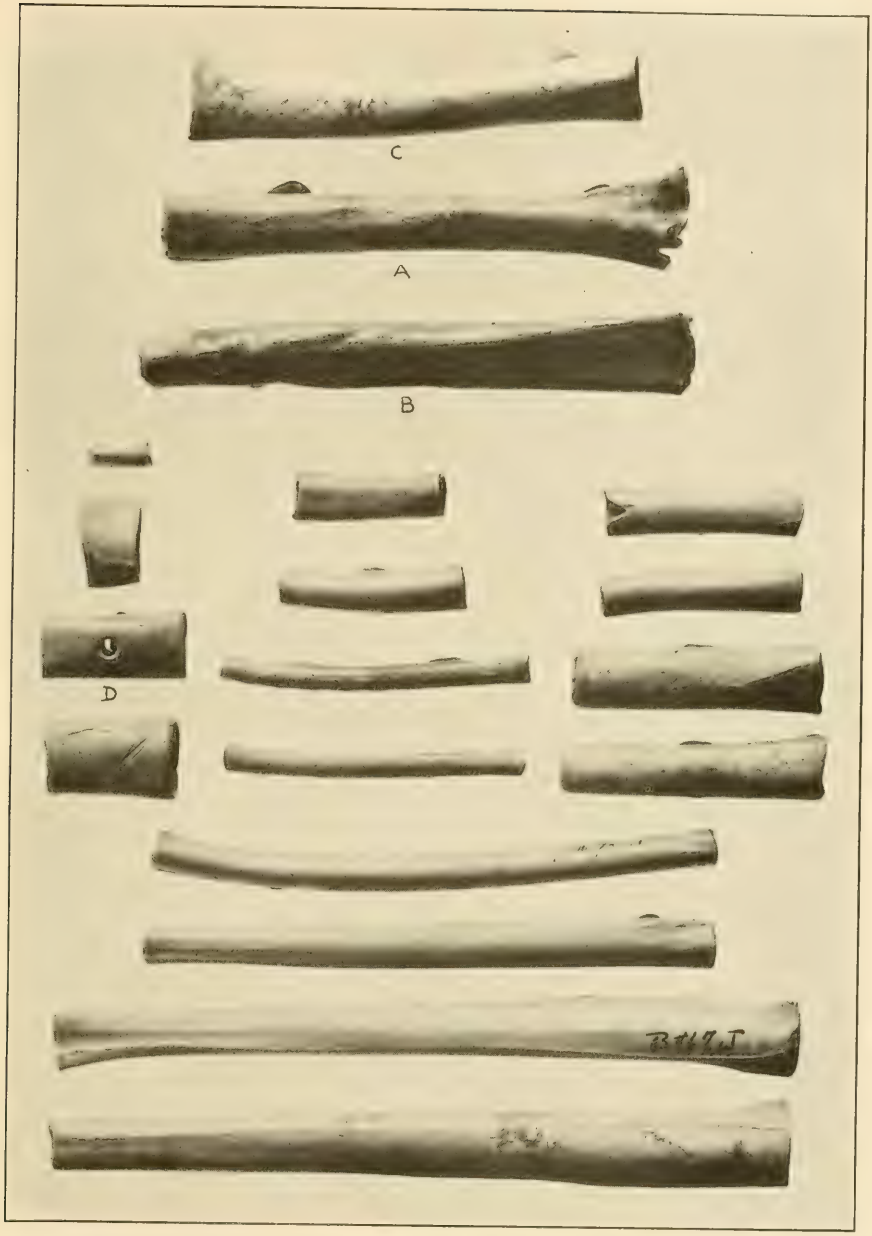


BONE IMPLEMENTS.

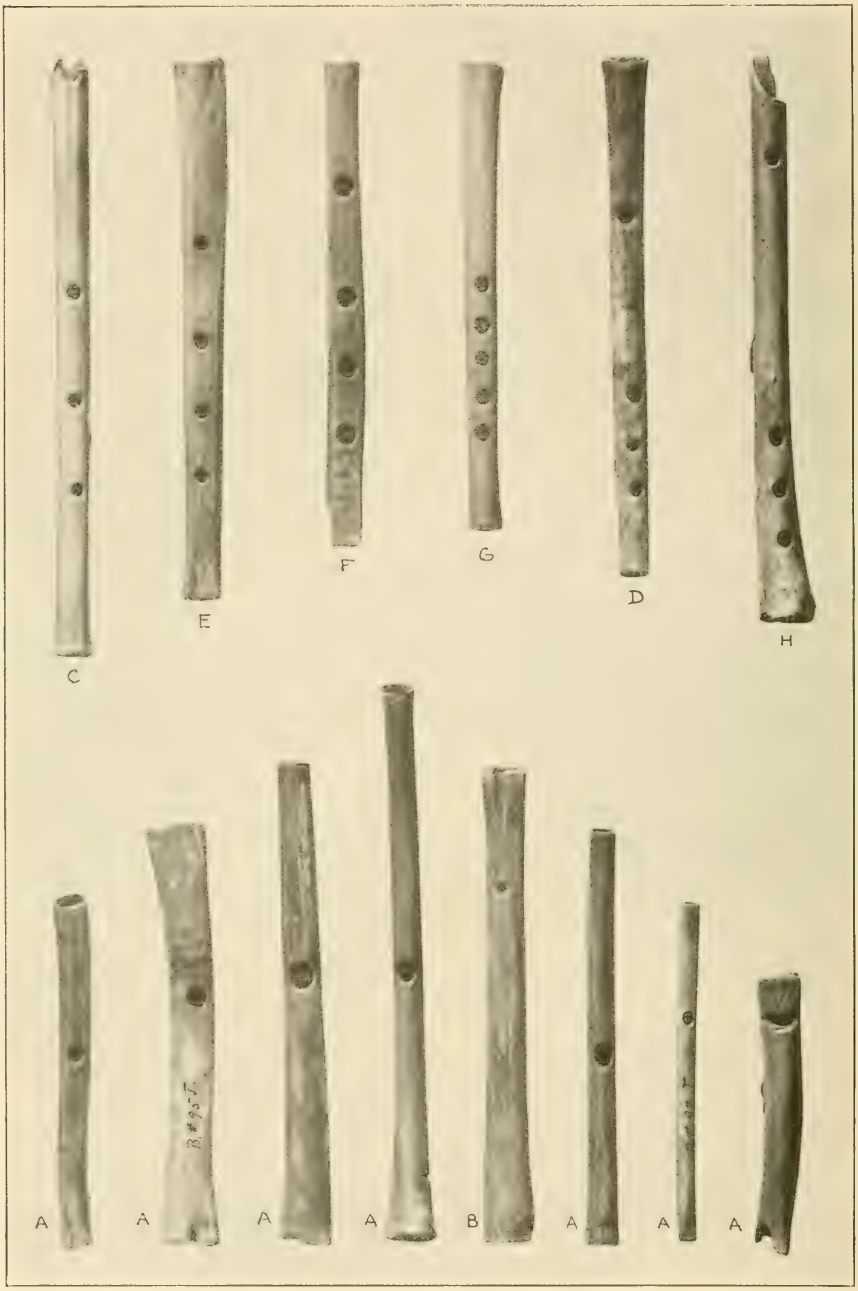
A, *B*. Tanning tools. *C*, *D*, *E*. Use unknown.



A, B. Part of a headdress. *C.* Bone breastplate. *D, E.* Weaving implements. *F, G.* Dirks.

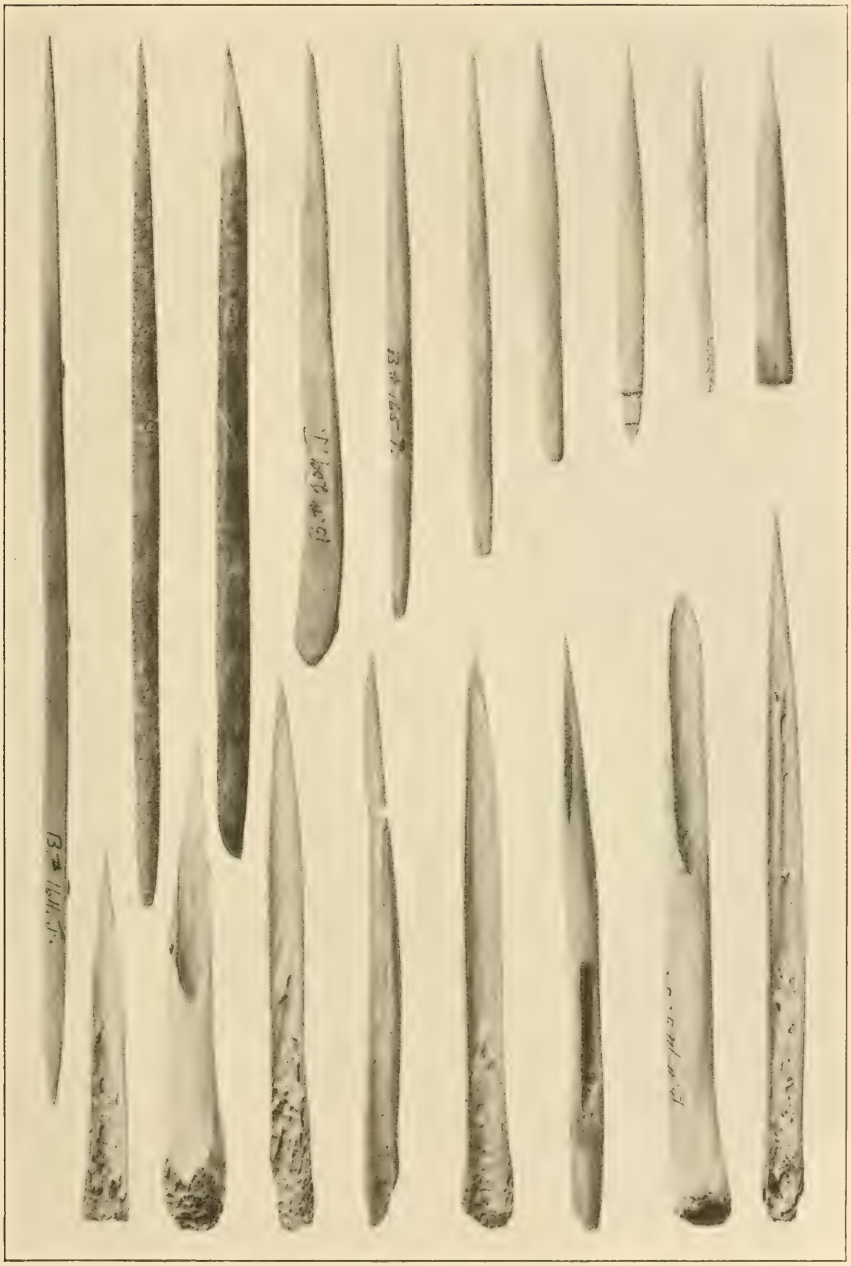


BONE BEADS.



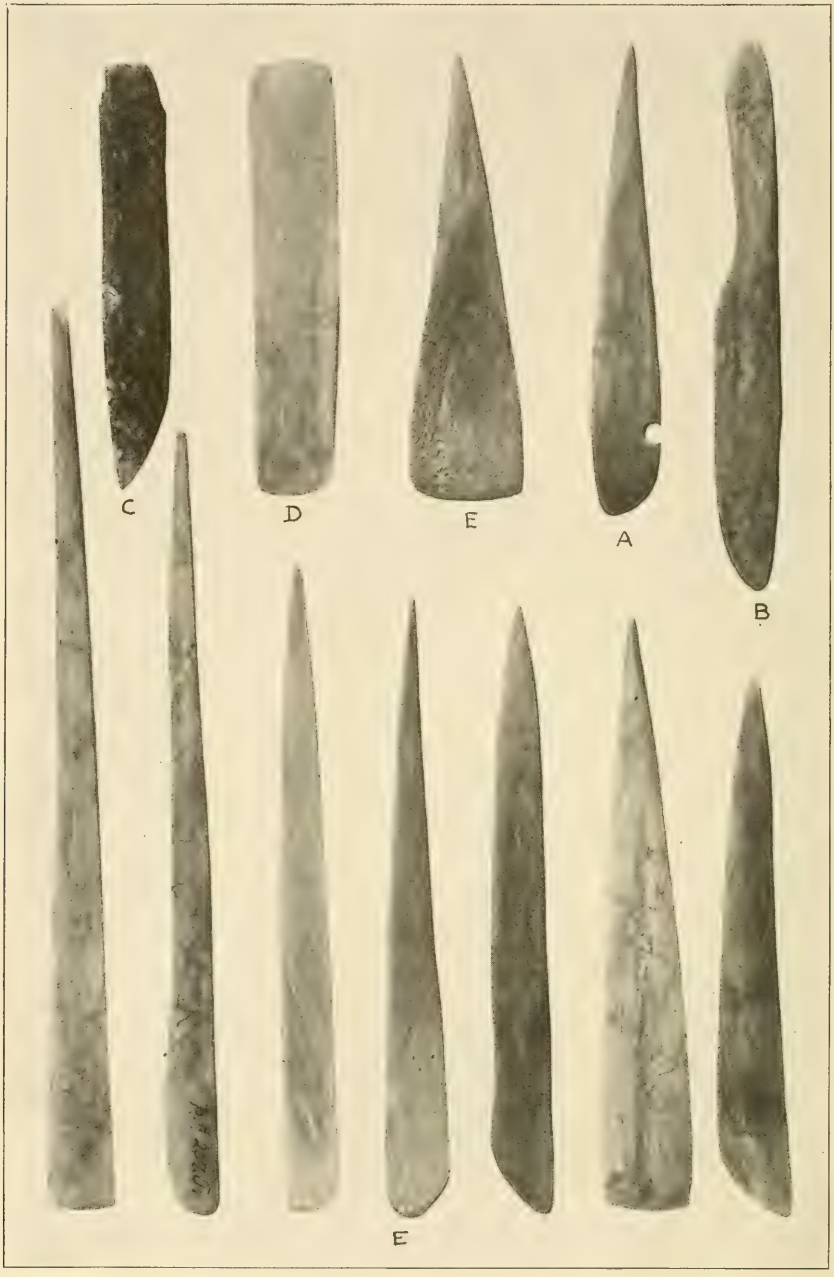
A, B. Bone turkey calls. *C–H.* Bone flutes or pipes.

B C D F F F F E F F

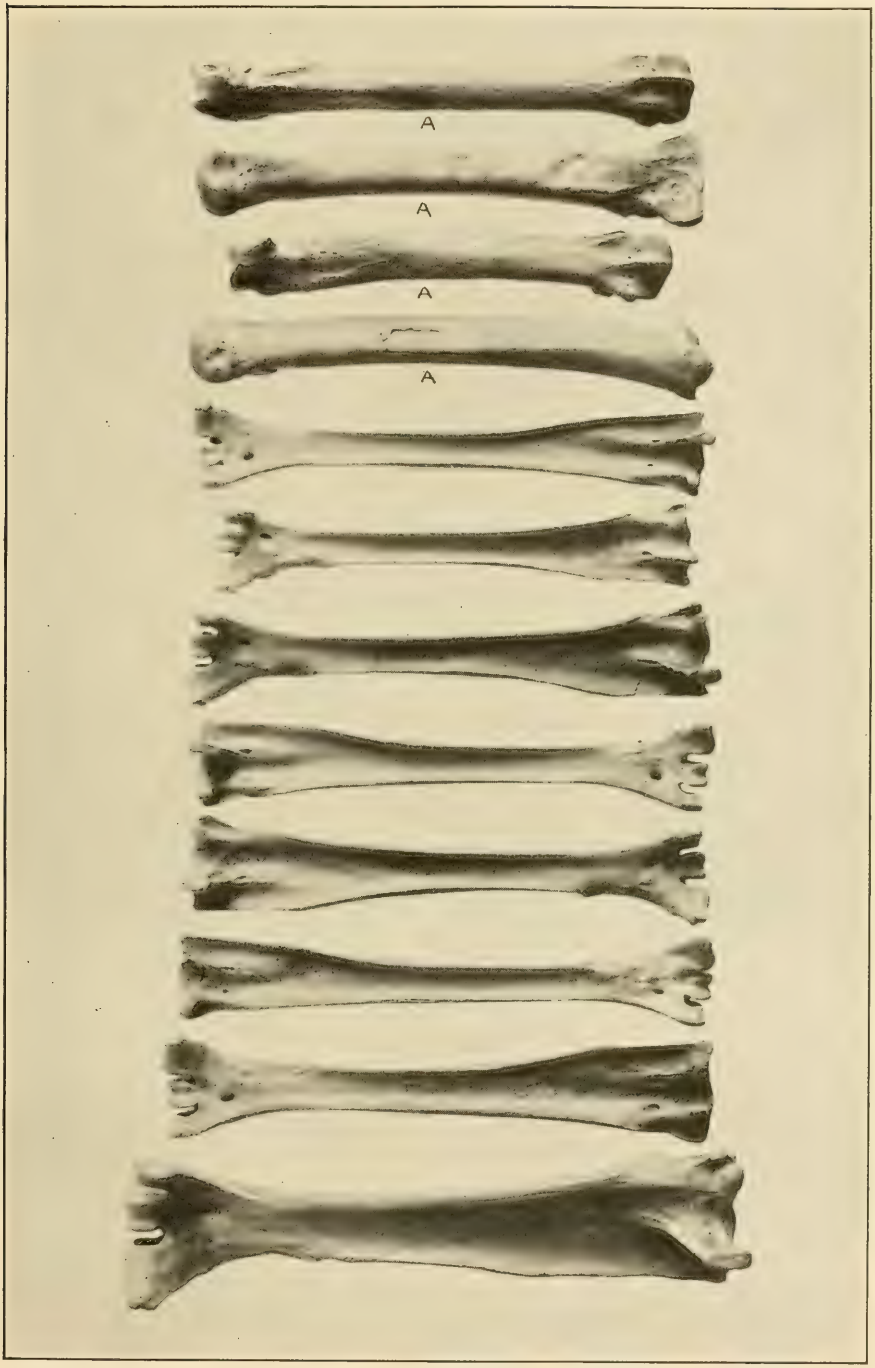


A A A A A A A A

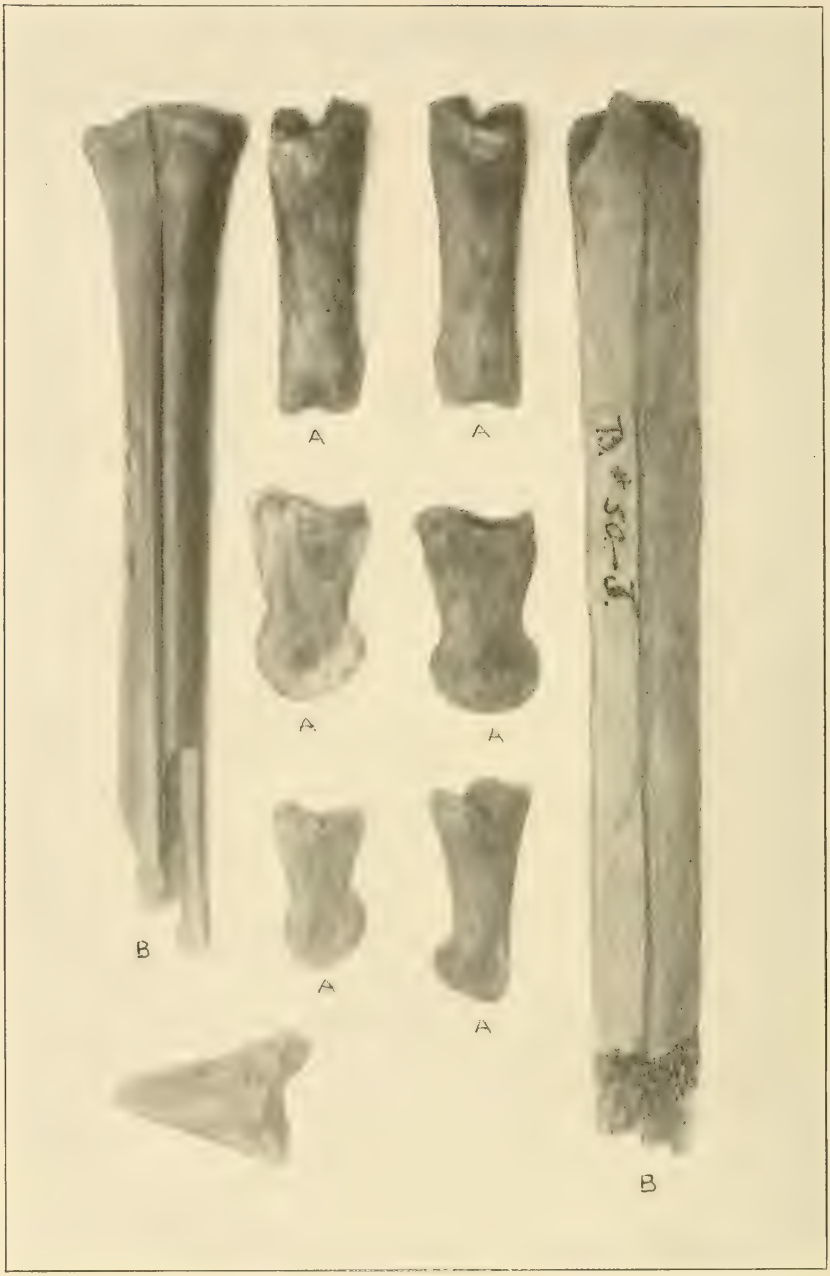
A. Bone awls, split or hollow type. *B*, *C*, *D*. Pins. *E*., *F*. Needles, solid type.



A. Spatula. *B, C*. Bone knives. *D*. Bone sliver. *E*. Spatulas.



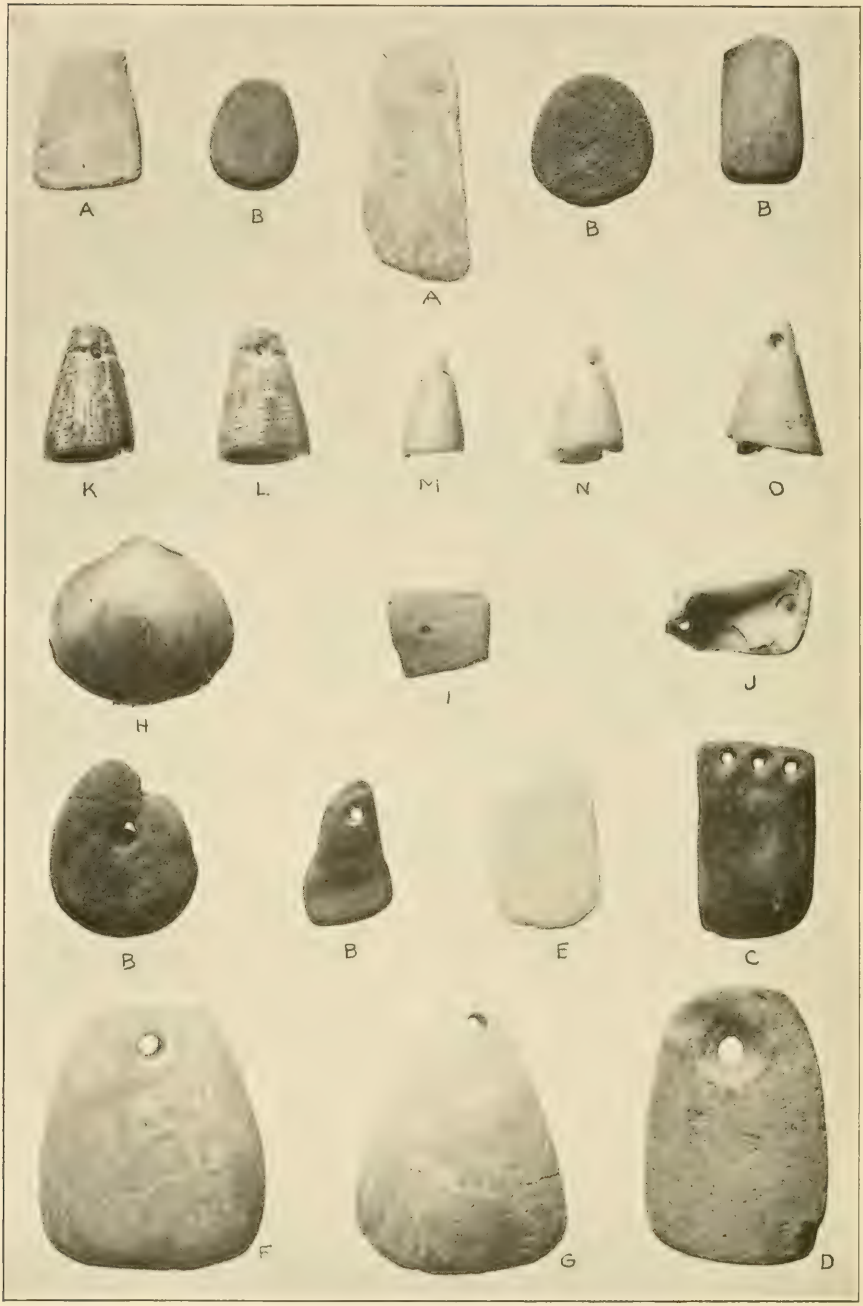
MAMMAL AND BIRD BONES.



MISCELLANEOUS BONE OBJECTS.

PIPES.

PIPES IN COURSE OF MANUFACTURE.



MISCELLANEOUS SHELLS AND PENDANTS.

CLAYS AND PASTES.

A. *B.* *B.* *C.*

A. *H.* *I.*

F. Pinched ware. *J.* *E.*

K. *D.* *E.* *G.*

SMALL POTTERY.

DUCK OR BIRD SHAPED POTTERY.

COOKING WARE.

A.

B.

C.

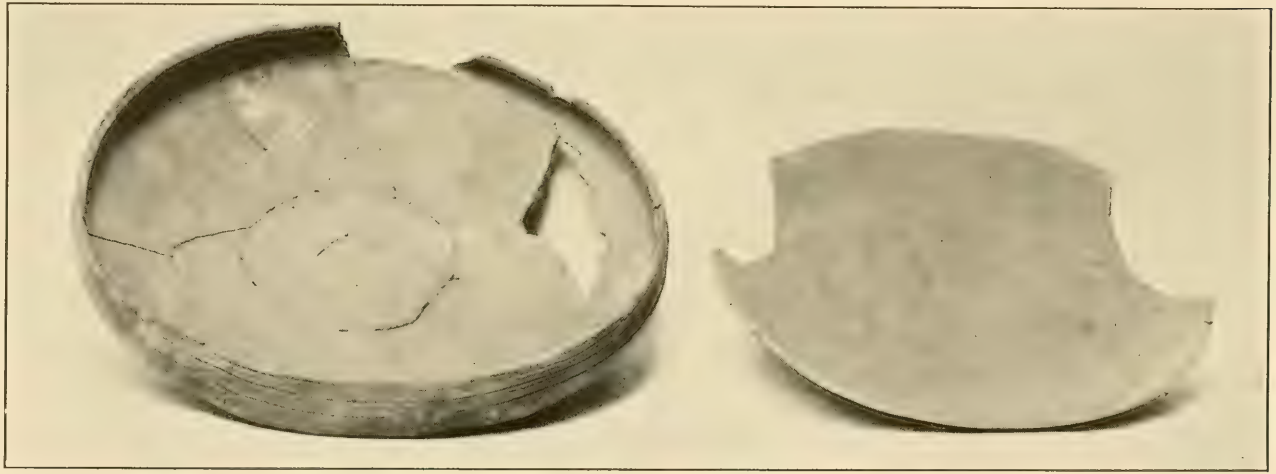
A, B. Uncovering a pot buried in the floor. *C.* Pot buried in débris.
Photographs by Wesley Bradfield.

D. Pottery and metate in house débris.

SMALL BISCUIT WARE BOWLS.

A. Incised ware.

B. Biscuit ware.



C. Chocolate paste ware.

D. Red ware.

B.

A.

A.

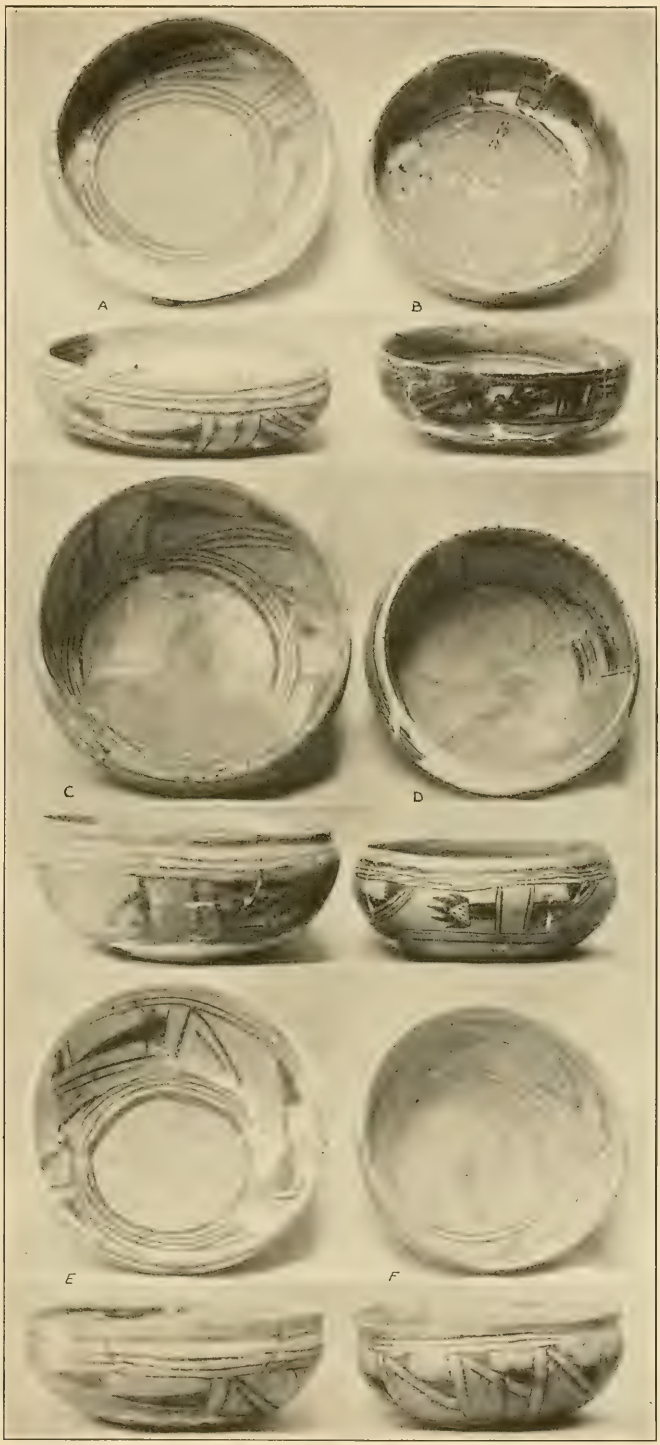
C. *E.*

CEREMONIAL POTTERY.

A. Biscuit ware.

B. Incised ware.

BISCUIT WARE.



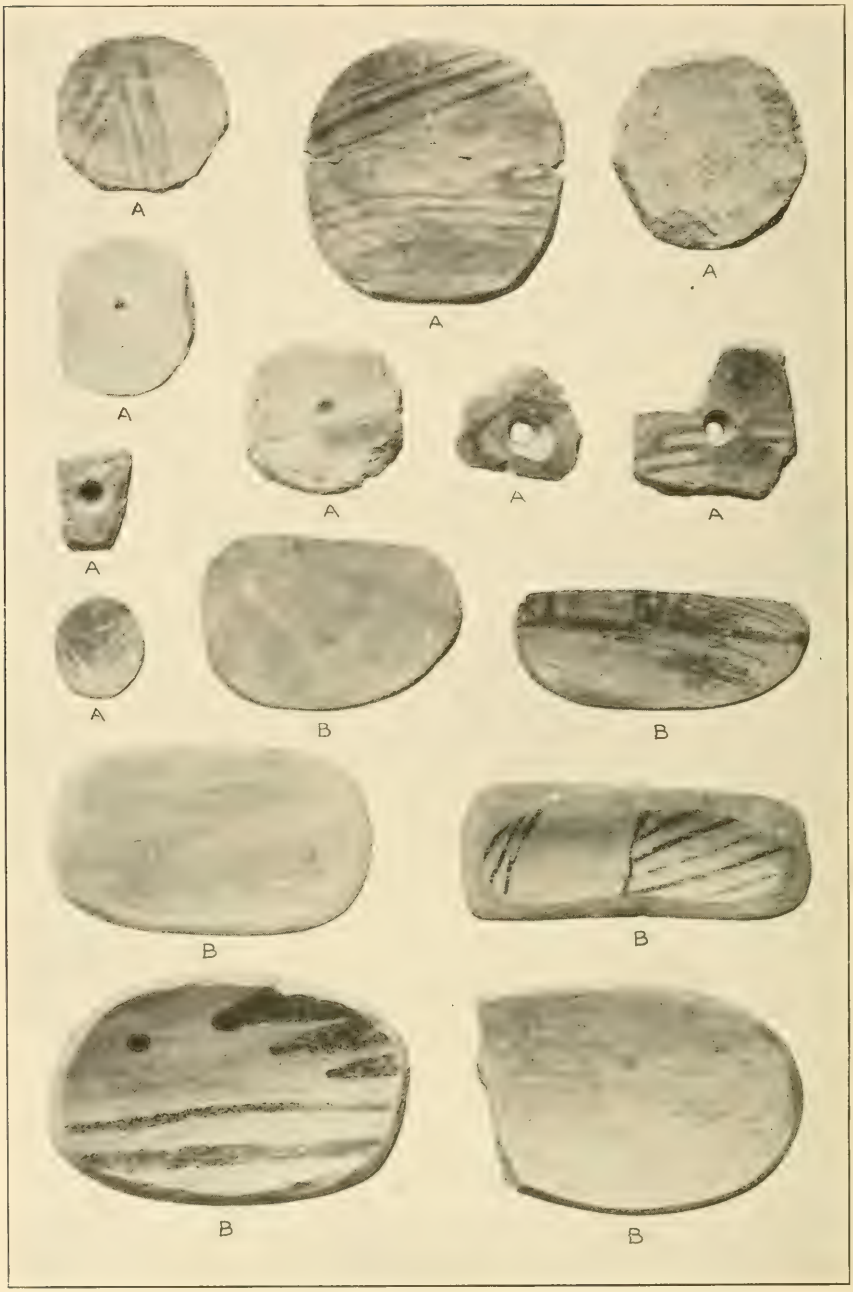
A, *C–F*. Biscuit ware. *B*. Glazed decorated ware.

A. Water jars of biscuit ware.

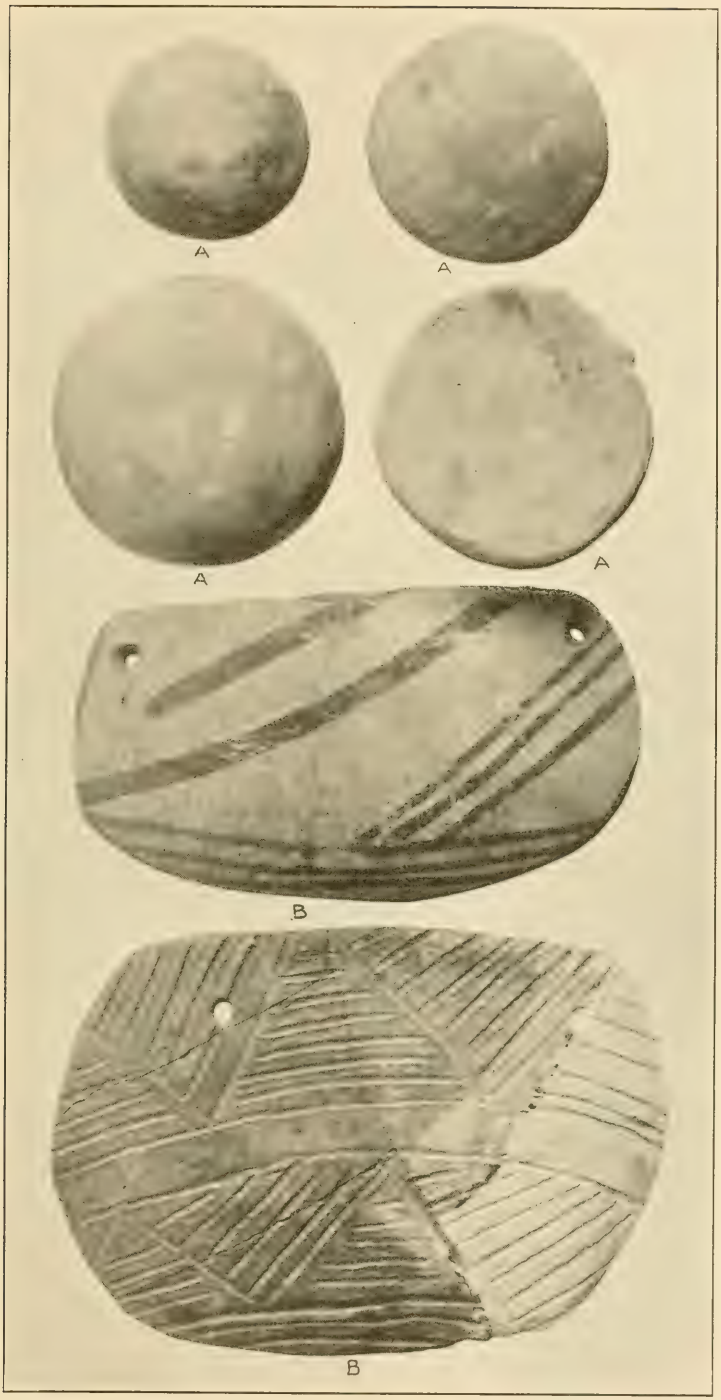
B. Water jars of biscuit ware.

C. Red ware with glazed decoration.

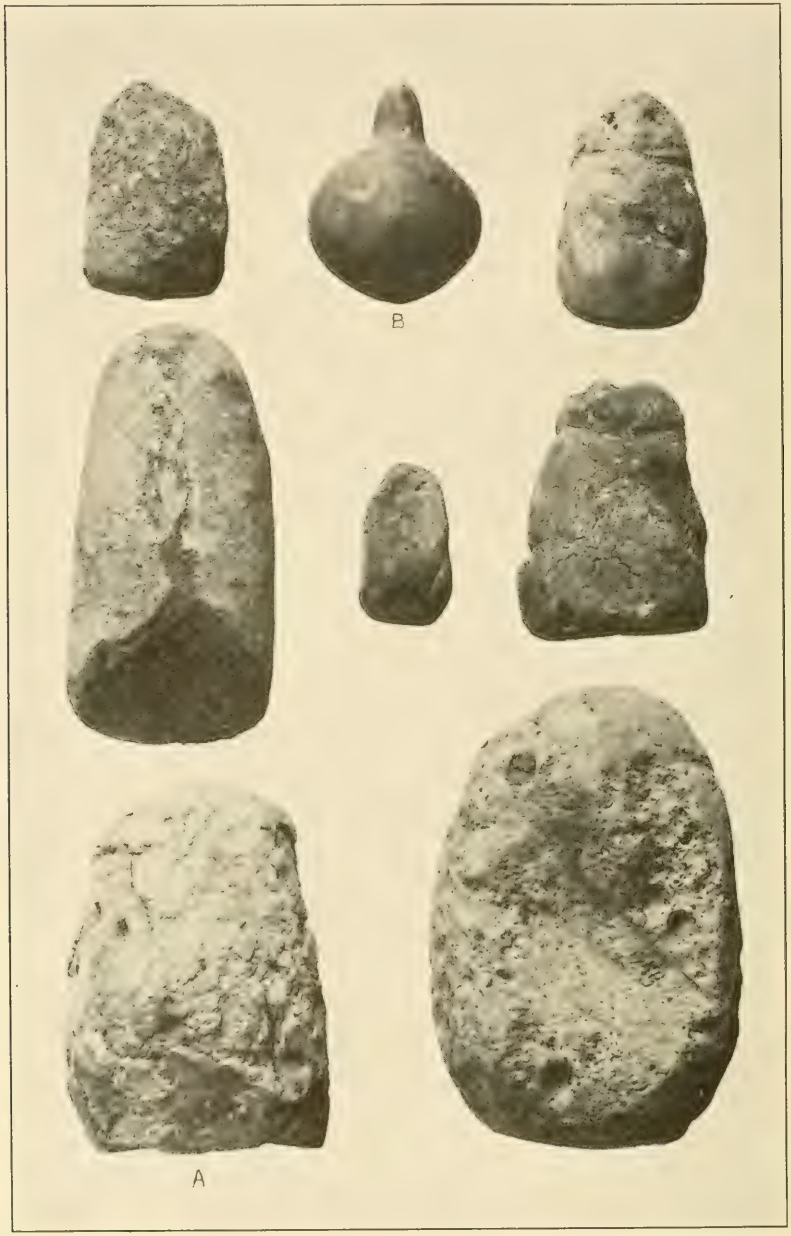
INCISED WATER JARS, CHOCOLATE PASTE.



A. Three at top, gaming tallies; others, spindle whorls. *B*. Implements for making pottery.



A. Pot lids. *B*. Gorgets.



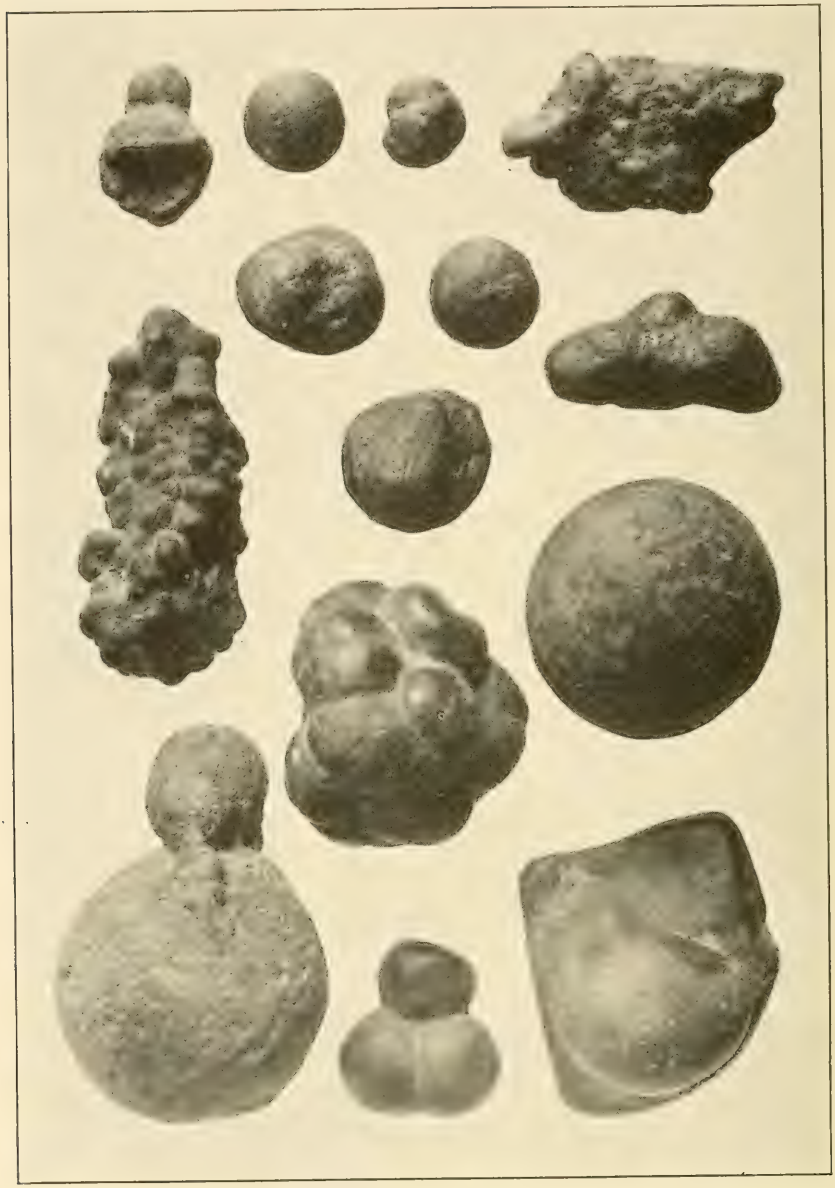
TIPONI OR PRAYER PLUME BASES.

UNUSUAL DECORATIONS ON BISCUIT WARE SHERDS.

BISCUIT WARE HANDLES.

MISCELLANEOUS OBJECTS.

A. Turquoise for inlay. *B*. Turquoise bead. *C*. Shell bead. *D*. Bit of chalcedony. *E*. Turquoise matrix. *F*. Copper ore. *G*. Bits of agate. *H*. Bits of smooth "lucky" stones. *I*. Olivella shells. *J*. Nassa shell.



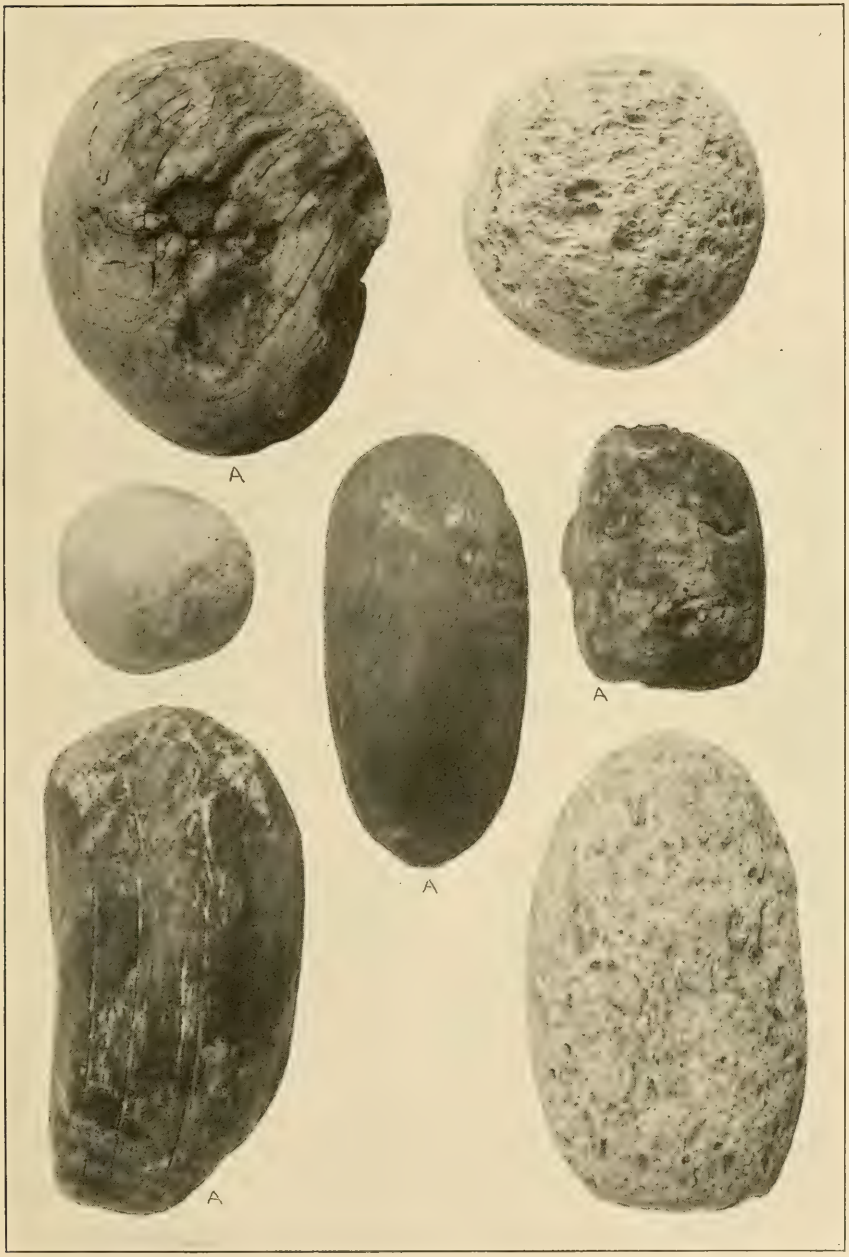
CONCRETION FETISHES.

CEREMONIAL OBJECTS.

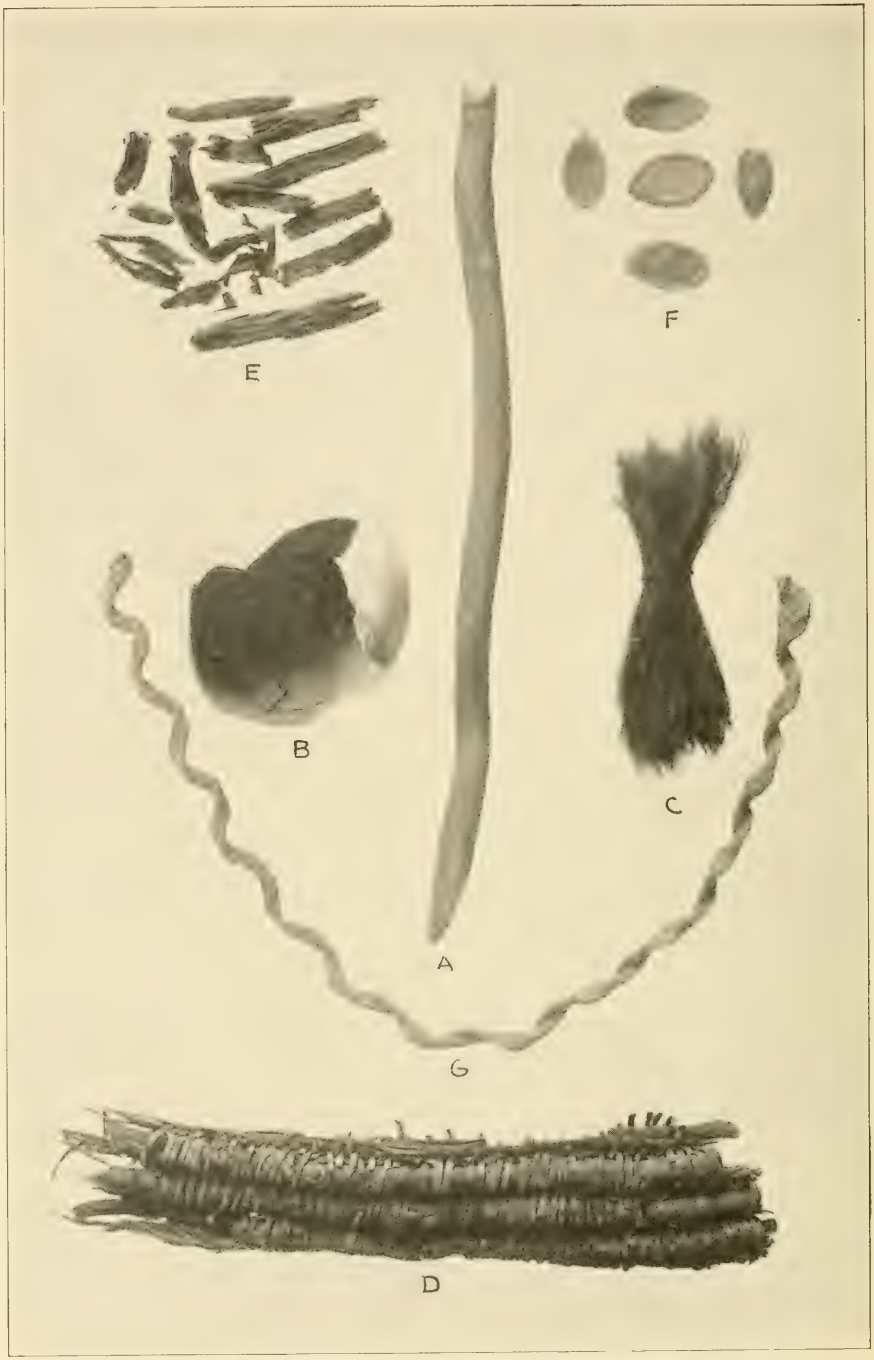
SELENITE CEREMONIAL OBJECTS.

MINERAL OBJECTS PROBABLY USED AS FETISHES.

KOSHARE FETISHES AND "FIRESTONE" KAYÉS.

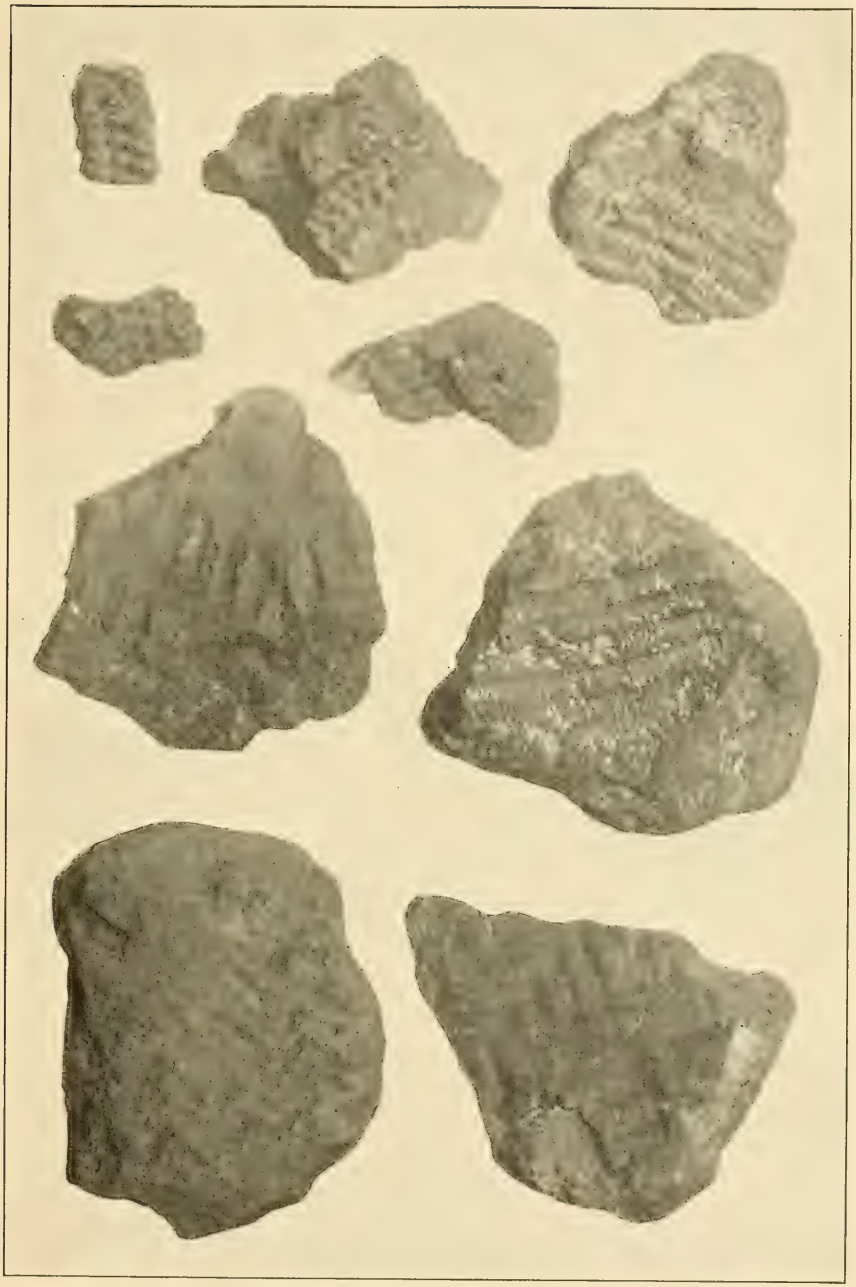


WOODEN OBJECTS.



MISCELLANEOUS OBJECTS.

A. Wooden arrow. *B*. Turkey eggshell. *C*. Human hair. *D*. Fragment of basket. *E*. Remains of basket. *F*. Pumpkin or squash seeds. *G*. Rawhide thong.



BASKET IMPRESSIONS IN CLAY.

PICTOGRAPHS.

A.

B.

C.

SHRINES.

A.

B.

C.

BURIALS.

Photographs by Wesley Bradfield.

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01421 8267